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Guidance for the Reregistration of Pesticide Products Containing Benomyl as the Active Ingredient

(U.S.) Environmental Protection Agency
Washington, DC

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U.S. Department of Commerce
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GUIDANCE FOR THE REREGISTRATION OF PESTICIDE PRODUCTS (REGISTRATION STANDARD)

CONTAINING

BENOMYL

AS THE ACTIVE INGREDIENT

CHEMICAL CODE: 099101

CAS: 17804-35-2

CASE NUMBER: GS-0119

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF PESTICIDE PROGRAMS

WASHINGTON, D.C. 20460

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This document contains information regarding the registration of pesticide products containing the subject active ingredient. The document includes how to register under a registration standard, regulatory position and rationale, and summaries of date requirements and data gaps. Also included is a bibliography containing citations of all studies reviewed by EPA in arriving at the positions and conclusions contained in the standard.

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INTRODUCTION

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), Section 3(g), directs the U.S. Environmental Protection Agency (EPA) to reregister all pesticides as expeditiously as possible.

To carry out this task, EPA has established the Registration Standards program, which reviews all pesticide products containing active ingredients first registered before January 1, 1977. Pesticides are reviewed in use clusters which have been ranked to give earliest review to pesticides used on food and feed crops.

The Registration Standards program involves a thorough review of the scientific data base underlying pesticide registrations and an identification of essential but missing studies which may not have been required when the product was initially registered or studies that are now considered insufficient. EPA's reassessment results in the development of a regulatory position, contained in a Registration Standard, on each pesticide and its uses. The Agency may require the registrant to modify product labels to provide additional precautionary statements, restrict the use of the pesticide to certified applicators, provide reentry intervals, modify uses or formulation types, specify certain packaging limitations, or other requirements to assure that proper use of the pesticide will not result in unreasonable adverse effects on the environment.

The scientific review, which is not contained in the Registration Standard, but is available from the National Technical Information Service, concentrates on the technical grade of the active ingredient and identifies missing generic data. However, during the review of these data, the Agency is also looking for potential hazards that may be associated with the end-use (formulated) products that contain the active ingredient. If the Agency has serious concerns, the end-use products (EPs) will be addressed as part of the Registration Standards program and regulatory actions, to the extent necessary to protect the public, will be proposed.

This Registration Standard contains the results of the Agency's review of all registered manufacturing-use products (MPs) containing benomyl as the sole active ingredient. During this review, the Agency evaluated all MPs and Section 3 and 24(c) uses registered for benomyl.

Part I, the Regulatory Assessment of this standard contains the following: A. Description of benomyl, B. Summary of regulatory assessment, C. Summary of the Agency's assessment, and D. Regulatory position and rationale for benomyl.

Part II, the Requirements for Registration, addresses the following: A. Criteria for registration, B. Acceptable ranges and limits, C. Required labeling, D. Products subject to this Standard, E. Requirements for submission of generic data, F. Requirements for submission of product-specific data, G. requirements for submission of revised labeling, and H. Instructions for submission.

Information on specific data requirements copies of appropriate forms for submission of information to the Agency are included in the appendices.

PART I. REGULATORY ASSESSMENT

The Agency has conducted a thorough review of the scientific data base on benomyl and reassessed its earlier regulatory position taken on benomyl in 1982. This Part of the Standard sets forth the results of that review beginning with a description of the chemical and its uses, followed by a discussion of the data base and the resultant regulatory position.

A. DESCRIPTION OF CHEMICAL

1. Description

Common Name : Benomyl
Chemical Name : Methyl 1-(butylcarbamoyl)-2-benzimidazolecarbamate
Empirical Formula : $C_{14}H_{18}N_4O_3$
Trade Names : Benlate®, Tersan 1991®
Chemical Abstracts Service (CAS) No. : 17804-35-2
OPP (Shaughnessy) No.: 099101

2. Use Profile

Type of Pesticide : Systemic Fungicide
Pest Controlled : Pathogenic Fungi
Registered Uses : Croplands, Greenhouses, Ornamentals, Turf sites, Preplant dip, Transplants
Predominant Use : Rice & Soybeans
Method of Application: Broadcast; Banded Around: Aerial: Over the Top, Irrigation Systems
Mode of Activity : Inhibition of fungal growth
Formulations
  Technical : 95 percent active ingredient
  End Use : Wettable Powder; Flowable Liquid, Oil Dispersable

3. History. Benomyl was patented by E.I. du Pont de Nemours and Co., Inc. (U.S. Patent Nos. 3,541,213 and 3,631,176) in 1968 and was first registered for use in 1969. Technical benomyl is being produced in the United States by E.I. du Pont de Nemours and Co., Inc., of Wilmington, Delaware.

On December 6, 1977, the Environmental Protection Agency initiated a Special Review [previously referred to as the Rebuttable Presumption Against Registration (RPAR) Process] for benomyl because of its mutagenic, teratogenic, reduced spermatotoxic, and acute aquatic effects. 42 Fed. Reg. 61970. In addition, the Agency concluded that the use of benomyl according to current label directions could result in significant reductions in local populations of earthworms. This Special Review was supported by a Position Document 1 (PD 1).

In the Preliminary Determination concluding the Special Review, the Agency reaffirmed its risk concerns, except for its concern about the potential local population reduction of earthworms. 44 Fed. Reg. 51166 (August 30, 1979). The support document for this preliminary determination was the Position Document 2/3 (PD 2/3).

Prior to the publication of the final benomyl regulatory decision, new studies were received by the Agency, indicating that benomyl and its major metabolite, methyl-2-benzimidazole carbamate (MBC) were carcinogenic. The Agency issued its final regulatory decision on benomyl on October 20, 1982, 47 Fed. Reg. 46747. In this Notice and the position document supporting the decision (Position Document 4), the Agency determined that the potential oncogenic, mutagenic, teratogenic, and spermatotoxic risks of benomyl would be exceeded by the benefits associated with the use of benomyl products when a dust mask was used by applicators during mixing and loading of benomyl for aerial application. The Agency also determined that a monitoring study of benomyl residues in rice field water treated with benomyl must be submitted. This registration standard reassesses the decisions announced in the final determination of the Special Review.

B. SUMMARY OF ASSESSMENT.

The Agency has reviewed all data submitted to support the registration of Benomyl. This includes data on benomyl's primary metabolite: methyl-2-benzimidazole carbamate (MBC). Based on the review of these data, the Agency has determined the following: (See Section C of this Part for more detailed information).

1. Benomyl poses a limited oncogenic risk from dietary exposure. The pesticide was classified as a Group C oncogen, which is defined as a possible human oncogen, based on the following:

   (a) Benomyl and MBC have been shown to cause tumors solely in the mouse liver.

   (b) The liver tumors produced by benomyl and MBC were observed in two related strains of mice (CD-1 and SPF Swiss), whereas no liver tumors were produced by MBC in another strain of mice (NMRKf SPF-71).

   (c) Neither benomyl nor_MBC are oncogenic in ChR-CD rats.

   (d) Benomyl and MBC produced weak mutagenic effects consistent with spindle poison activity rather than gene mutation or DNA repair activity.

2. Benomyl has been shown to cause teratogenic effects in rats (microphthalmia) and mice (cleft palate, supernumerary ribs, subnormal vertebral centrum). The No-Observed-Effect-Level (NOEL) for rats was 30 mg/kg/day. The NOEL for mice was 50 mg/kg/day.

3. In a 3 generation study on male and female rats, the administration of benomyl resulted in decreased pup weanling weights at 500 ppm (25 mg/kg/day) and above.

4. Benomyl produced testicular effects (decreased size of testes and depressed spermatogenesis) in test animals.

5. Benomyl and MBC are extremely toxic to freshwater fish and aquatic invertebrates.

6. Mixer/loader risk can be reduced to acceptable limits through the use of a dust mask for aerial application.

7. Benomyl has significant benefits that are not outweighed by the identified risks:

(a) Benomyl is a broad spectrum fungicide that controls a wide variety of plant diseases in field and vegetable crops, rice, tree fruit and nut crops, greenhouse, ornamentals, and turf sites. It is also used as a postharvest dip for fruits.

(b) Due to Benomyl's systemic properties and broad activity spectrum, the number of preharvest treatments needed for crop disease control are greatly reduced. Benomyl is particularly efficaceous against plant diseases during seasons of average to heavy rainfall when conditions conducive to disease development exist.

(c) Benomyl is applied aerially, by ground equipment, with liquid fertilizers, and over-the-top in tank mixes. Benomyl is also widely tank mixed with non-benzimidazole fungicides to prevent the emergence of benomyl-resistant plant pathogens.

(d) Benomyl and certain benzimidazole fungicides provide rice growers with effective control agents against foliar and head diseases of rice.

The Agency has identified missing data necessary to evaluate the environmental and human risks associated with the use of benomyl. These data must be developed in order to maintain registrations of products or register new products containing benomyl. The table in this section summarizes the data gaps, in addition to product chemistry information. Please note that this is only a summary and more details can be obtained by referring to Table A, Appendix I.

The Agency has also determined that label revisions must be made in the following areas (See Part II, Section C.):

- Environmental Hazards
- Grazing Restrictions
- Protective Clothing
- Rotational Crop Restrictions

SUMMARY OF DATA GAPS - BENOMYL

(Refer to Table A, Section D, Part II,
for details regarding specific requirements)

DATA REQUIREMENT — REMARKS

158.120 Product Chemistry:

- 61-2 Description of Beginning Materials and Manufacturing Process
- 62-2 Certification of Limits
- 63-9 Vapor Pressure
- 63-12 pH

158.125 Residue Chemistry:

- 171-4 Nature of Residue (Plant & Animal Metabolism)
- 171-4 Residue Analytical Methods
- 171-4 Residue Studies in Cattle, Goats, Hogs, Horses, Sheep, Milk, Poultry and Eggs.
- 171-4 Residue Studies on Crops, Processed Food/Feed Commodities

158.135 Toxicology:

- 82-4 90-Day Inhalation (Rat)
- 85-1 General Metabolism

158.130 Environmental Fate:

- 162-1/4 Metabolism Studies
- 163-1/3 Mobility Studies/Ground Water Assessment
- 164-1,2,5 Dissipation Studies
- 165-1/4 Accumulation Studies

SUMMARY OF DATA GAPS - BENOMYL (Continued)

(Refer to Table A, Section D, Part II,
for details regarding specific requirements)

DATA REQUIREMENT		REMARKS
158.145 Wildlife & Aquatic Organisms		
71-1	Acute Avian Oral Toxicity	
71-2	Sub acute Avian Oral Toxicity (Waterfowl)	
70-1	Special Testing (Residue Monitoring)	
72-1	Freshwater Fish Toxicity (Warmwater Species)	
72-2	Acute Toxicity to Freshwater Invertebrates	
72-3	Acute Toxicity to Estuarine & Marine Organisms	
72-4	Fish Early Life Stage & Aquatic Invertebrate Life-Cycle	

C. AGENCY ASSESSMENT.

The Agency has conducted a thorough review of the scientific data base for benomyl. The following is a discussion of the results of the review.

1. Preliminary Risk and Benefit Analysis

a. Risks. To assess the risks associated with benomyl, the Agency reviewed the existing data base. This included the review of studies conducted for oncogenicity, mutagenicity, reproductive effects, teratogenicity and metabolism. Based on these studies and available exposure information, the dietary risk and applicator exposure and risk have been calculated. The following is a discussion of the results of the risk assessment.

(1) Oncogenicity Studies:

a) Mouse Oncogenicity Study of Benomyl

Haskell Laboratory administered Benomyl in the diet to groups of 80 male and 80 female CD-1 mice at concentrations of 0, 500, 1500 or 7500/5000 ppm for 2 years. The high dose of 7500 ppm was reduced to 5000 ppm at 37 weeks in males and females due to weight loss. There were no significant differences in survival rates in either males or females. The following incidence patterns of tumors are suggestive of a compound-related effect.

Organ & Tumor Type	Sex	(ppm) 0	500	1500	7500/5000
		(Mg/kg/day) 0	25	75	375/250
Lung:					
Alveologenic carcinoma	M	13/79(16%)	24/79(30%)*	23/79(29%)*	16/80(20%)
	F	16/77(21%)	7/79(9%)	4/78(5%)	6/74(8%)
Liver:					
Adenoma	M	9/77(12%)	9/80(11%)	11/79(14%)	10/80(12%)
Carcinoma	M	16/77(21%)	26/80(32%)*	41/79(52%)*	17/80(21%)
Combined	M	25/77(32%)	35/80(44%)*	52/79(66%)*	27/80(34%)
Adenoma	F	2/77(2.5%)	2/80(2%)	7/79(9%)	7/77(9%)
Carcinoma	F	2/77(2.5%)	7/80(9%)*	6/79(7%)	14/77(18%)*
Combined	F	4/77(5%)	9/80(11%)	13/79(16%)*	21/77(27%)*

*= $p<0.05$ compared to controls

Pulmonary carcinomas were significantly elevated in male mice (low and mid doses). The effect did not appear to be compound related for the following reasons: 1) A dose-response effect was not observed in the Cochran-Armitage test for trend. 2) Low tumor incidences in high doses could not be attributed to early death. 3) All tumor incidences were within the range of historical controls (16% to 36%). The mean ± S.D. for pulmonary tumors for seven studies, not including benomyl, conducted at Haskell Labs for the two years preceding and subsequent to the benomyl study was 24±17 % (total of 564 animals). 4) The tumor incidence in the benomyl control group was equal to the lowest incidence level observed in the historical control group. 5) Pulmonary tumor incidences in the low and mid dose groups are not statistically different from the historic controls and only marginally significant ($p = .05$) from the concurrent controls. 6) In addition, nearly all benomyl administered is rapidly converted to MBC and MBC did not produce an increase in pulmonary tumors in other studies performed in CD-1 mice. Therefore these tumors are not considered to be biologically significant or compound related.

Hepatocellular carcinomas were significantly elevated in male (low and mid doses) and female (low and high doses) mice. In addition, adenomas and carcinomas combined were significantly elevated in males (low and mid doses) and females (mid and high doses). The tumorigenic responses appeared to be compound related; e.g., they occurred with significant positive trends, and the elevated incidences exceeded historical rates for these tumor responses in two other studies conducted at the registrant's laboratory. Furthermore, similar liver tumorigenic responses were produced by the MBC metabolite in other studies performed in CD-1 mice (see below). The oncogenic responses that were produced by benomyl in treated mice were not accompanied by increased incidences of hepatocellular adenomas or hyperplasia.

The highest dose of benomyl tested in male mice in this study probably exceeded a maximum tolerated dose (MTD) level. This dose in males produced a decreased weight gain (approximately -9%), heptocellular toxicity (e.g., foci of cellular alteration, cytomegaly, and foci of degeneration), and degenerative changes in the testes (e.g., atrophy, seminiferous tubule degeneration, and interstitial cell hyperplasia) and in the epididymis (aspermia). This dose did not produce liver tumors in males, possibly because of the hepatocellular toxic changes that were observed (e.g., the observed liver toxicity may have altered the ability of benomyl to be metabolized to MBC). The low and mid dose levels of benomyl did produce liver tumors in males, but these doses were not associated with any other toxic effects and thus did not approximate a MTD level.

The highest dose of benomyl tested in females probably approximated a MTD level as evidenced by findings of decreased weight gain (approximately -9%), elevated liver weights, reduced kidney weight, and spleen hemosiderosis. This dose in females did produce liver tumors, as did lower doses of the compound. Benomyl did not produce the exaggerated liver toxic changes in female mice that were observed in male mice.

b) Mouse Oncogenicity Study of MBC

Haskell Laboratory administered MBC in the diet to groups of 80 male and 80 female CD-1 mice at concentrations of 0, 500, 1500, 7500 (females) or 7500/3750 (males) ppm for 2 years. The high dose of 7500 ppm was reduced to 3750 ppm at 66 weeks in males due to increased mortality, and all males were ultimately sacrificed at 73 weeks. The following incidence pattern of liver tumors was observed.

Liver Tumor Type	Sex	Dose			
		(ppm) 0	500	1500	7500/#
		(Mg/kg/day) 0	25	75	375
Adenoma	M	11/80(14%)	15/80(19%)	14/80(17%)	3/80(4%)
Carcinoma	M	2/80(2%)	5/80(6%)	9/80(11%)*	0/80(0%)
Combined	M	13/80(16%)	20/80(25%)	23/80(28%)*	3/80(4%)
Adenoma	F	0/79(0%)	5/78(6%)*	5/80(6%)*	3/78(4%)
Carcinoma	F	1/79(1%)	4/78(5%)	15/80(18%)*	12/78(15%)*
Hepatoblastoma	F	0/79(0%)	0/78(0%)	1/80(1%)	0/79(0%)
Total	F	1/79(1%)	9/78(11%)*	21/80(26%)*	15/78(19%)*

*= $p<0.05$ compared to controls

#= Reduced to 3,750 ppm (188 mg/kg/day) in males at 66 weeks.

Hepatocellular carcinomas, and adenomas and carcinomas combined, were significantly elevated in male mice (mid dose level); no increase in adenomas occurred in males. The lack of oncogenic response in high dose males is likely to be explained by their early deaths and sacrifice at 73 weeks. In female mice there were significant increases in adenomas (low and mid doses), carcinomas (mid and high doses), and adenomas and carcinomas (all 3 dose levels tested). The Toxicology Peer Review Committee (TPRC) of the Office of Pesticide Programs noted that this profile of liver tumors resembled that described above for benomyl in CD-1 mice. No increased incidence of liver hyperplasia occurred in treated mice. A comparison of the MBC liver tumor data with historical control data from two other studies conducted at Haskell Laboratory (the "unnamed" study and the benomyl mouse study in CD-1 mice; see Copley/Harris memorandum of 12/19/85, page 10) indicated that only the carcinomas (mid and high dose levels) and the adenomas/carcinomas combined (all 3 dose levels tested) in female mice exceeded the control response rates in the other studies.

The high dose level of MBC tested in male mice clearly exceeded a MTD level because of excess mortality. The mid dose level appeared to approximate a MTD level. Both these doses in males caused reduced weight gain, hepatocellular toxicity (e.g., pigmented macrophages, hypertrophy, and centrilobular necrosis), renal tubular pigmentation, thymic lymphoid depletion, and sperm stasis. The changes however were more severe at the high dose level.

The highest dose of benomyl tested in females appeared to approach but did not exceed the MTD level. This dose caused increased liver weight and foci of eosinophilic hepatocellular alteration, renal tubular pigmentation, and thymic lymphoid depletion.

c) Mouse Oncogenicity Study of Carbendazim (99% MBC):

In a study performed by the Central Institute for Nutrition and Food Research (TNO), and reviewed in summary form by the World Health Organization (WHO) (see Copley/Harris memorandum of 12/19/85, page 7), MBC was administered in the diet to groups of 100 male and 100 female SPF Swiss mice at concentrations of 0, 150, 300 or 1000/5000 ppm for 80 weeks. The 1000 ppm concentration was increased to 5000 ppm in males and females at week 8. Data were presented in summary form only. The following incidence pattern of liver tumors was observed.

Liver Tumor Type	Sex	Dose			
		(ppm) 0	150	300	1000/5000
		(mg/kg/day) 0	22.5	45	150/750
Neoplastic Nodule	M	9/100(9%)	7/98(7%)	14/100(14%)	16/100(16%)
Carcinoma	M	1/100(1%)	1/98(1%)	9/100(2%)	3/100(3%)
Hepatoblastoma	M	0/100(0%)	1/98(1%)	1/100(1%)	7/100(7%)*
Total	M	10/100(10%)	8/98(8%)	16/100(16%)	17/100(17%)
Neoplastic Nodule	F	0/97(0%)	1/99(1%)	1/98(1%)	9/97(9%)*
Carcinoma	F	1/97(1%)	0/99(0%)	0/98(0%)	0/97(0%)
Hepatoblastoma	F	0/97(0%)	0/99(0%)	0/98(0%)	0/97(0%)
Total	F	1/97(1%)	1/99(1%)	1/98(1%)	9/97(9%)

*= P<0.01 compared to controls, Exact test.

Hepatoblastomas (a less common and malignant liver tumor than hepatocellular carcinoma) were significantly elevated in male mice (high dose level), and neoplastic nodules (i.e., adenomas) were significantly elevated in female mice (high dose level). The TPRC noted that the SPF Swiss strain of mouse used in this study is genetically similar to the CD-1 strain of mouse in which benomyl and MBC were tested. The CD-1 strain is an outbred strain of the SPF Swiss mouse. Both strains tend to exibit a high background incidence of liver adenomas in male mice.

Based on the summary information available for this study, the highest dose level of MBC tested did not appear to exceed a MTD level. The HDT caused increased relative liver weights and clear cell and/or mixed hepatic cell foci in males and females.

d) Mouse Oncogenicity Study of Carbendazim (MBC)

In another study reviewed by the WHO (see Copley/Harris memorandum of 12/19/85, page 8), MBC was administered in the diet to groups of 100 male and 100 female HOE NMRKf (SPF 71) mice at concentrations of 0, 50, 150, 300 or 1000/5000 ppm (0, 7.5, 22.5, 45 or 150/750 mg/kg/day) for 22 months. The 1000 ppm concentration was increased to 5000 ppm at week 8. No evidence of an oncogenic response in the liver or at any other site was observed. The TPRC noted that the NMRKf strain of mouse, in contrast to CD-1 and SPF Swiss mice, normally exhibits a low background incidence of liver tumors.

The highest dose of MBC tested in this study appeared to be close to a MTD level as indicated by findings of liver toxicity in both male and female mice (e.g., liver cell hypertrophy, clear cell foci, liver cells in mitosis, pigmented Kupffer cells, enlarged cell nuclei, and multiple cell necrosis).

e) Rat Oncogenicity Studies of Benomyl and MBC

Benomyl was studied in a 2-year dietary study (0, 100, 500 or 2500 ppm) (0, 5, 25, 125 mg/kg/day) in ChR-CD rats: the highest concentration was a systemic NOEL and no oncogenic effects occurred. A maximum tolerated dose (MTD) was not established for benomyl.

MBC was also studied in a 2 year dietary study (0, 100, 500, 2500/10,000 or 5000 ppm) (0, 5, 25, 125/500 or 250 mg/kg/day) in ChR-CD rats; no oncogenic effects occurred. The MTD was established at the highest dose demonstrated by weight loss in males and females (10%-20% less than controls) and hepatic pericholangitis. Both of the above studies were performed by Haskell Laboratory.

(2) Additional Toxicology Data on Benomyl and MBC:

a) Metabolism

Limited studies conducted in mice indicate that benomyl is primarily metabolized to MBC, which in turn is converted to 2-aminobenzamidole (2-AB) and also to 5-OHMBC and 5-OH-2-AB. The latter 2 metabolites undergo sulfate and glucuronide conjugation. Elimination of metabolites occurs rapidly in urine and feces (e.g., 94% of an orally administered radiolabeled dose was excreted in 96 hours in mice as the metabolites, with no parent compound detected). No unusual localization of benomyl or its metabolites has been found in animal tissues.

b) Teratology

Benomyl has been demonstrated to be teratogenic in several oral (gavage) studies conducted in both Wistar and ChR-CD rats at a dose of 62.5 mg/kg/day and higher. The most common abnormality in these studies was microphthalmia. In most of these studies, fetotoxic and embryotoxic effects were also observed at similar or greater dose levels. Benomyl was also reported to be teratogenic in one study in CD-1 mice at oral (gavage) doses of 100 mg/kg or more.

In the first study, benomyl was administered by gavage to 27 ChR-CD strain rats at each of the following doses: 0, 3, 10, 30, 62.5, and 125 mg/kg/day for days 7 through 16 of gestation. Dams were sacrificed on day 21 of gestation and the fetuses examined. There were no treatment related maternal or fetal toxic effects except for decreased fetal weight in the 62.5 and 125 mg/kg/day groups. There were significant increases in microphthalmia and anophthalmia at 62.5 and 125 mg/kg/day and distended lateral ventricles and hydrocephaly at 125 mg/kg/day. Two cases of microphthalmia also occured at 10 mg/kg/day. The NOEL for maternal toxicity was greater than 125 mg/kg/day and the fetal toxic NOEL was 30 mg/kg/day.

The second rat study involved the administration of benomyl by gavage to 46-48 Crl:CD® (SD)BR rats at each of the following doses: 0.3, 6.25, 10, 20, 30 and 62.5 (only 19 dams) mg/kg/day for days 7 through 16 of gestation. Dams were sacrificed on day 21 of gestation and the fetuses examined specifically for ocular effects. There were no treatment related signs of maternal toxicity noted. The high dose fetuses were significantly lighter than the controls. There was 1 fetus with microphthalmia present in the 16 litters in the high dose; no other ocular abnormalities were reported.

When considered together, these two rat studies give a NOEL of 30 mg/kg/day and a LEL of 62.5 mg/kg/day for teratogenic effects. The Wistar rat study gave similar results.

Benomyl technical was also administered by gavage to 25 pregnant CD-1 mice at each of the following doses: 0, 50, 100, and 200 mg/kg/day for days 7 through 17 of gestation. Dams were sacrificed on day 18 of gestation and the fetuses were examined. Doses as high as 200 mg/kg/day did not affect maternal viability or growth. Doses of 200 (significant from controls $p < 0.05$) and, to a much lesser extent, 100 mg/kg/day, adverseTy affected fetal development incluing: decreased fetal weight, and delayed skeletal and visceral (including subnormal vertebral centrums, enlarged cerebral ventricles, and renal pelves) development, and increased supernumerary ribs. The incidence of major anomalies observed in the fetuses was 1.3, 1.0, 16.8, and 47.3% at 0, 50, 100, and 200 mg/kg/day. The incidences of major fetal and litter anomalies were significant at the $p < 0.001$ in the mid and high dose groups. Anomalies included: short and/or kinky tail, fused vertebrae, fused ribs and cleft palate. The NOEL was 50 mg/kg/day and a LEL, based on teratogenic effects, was 100 mg/kg/day.

c) Reproductive Effects

In a 3 generation study on male and female rats, benomyl was administered in the diet at 0, 100, 500, and 2500 ppm (0, 5, 25, 125 mg/kg/day) to male and female ChR-CD rats evoking decreased pup weanling weights at 500 ppm and above. The NOEL was 100 ppm (5 mg/kg/day) and the LEL, based on decreased pup weanling weights, was 500 ppm (25 mg/kg/day).

d) Mutagenicity

Data provided in the Position Document 4 on Benomyl and MBC indicated that both compounds are spindle poisons often associated with aneuploidy and nondisjunction. For example, nondisjunction was reported in A. nidulans with both agents. The compounds also produced positive effects in tests to assess structural chromosome aberrations which were consistent with a spindle effect; e.g., benomyl was weakly positive for sister chromatid exchange in vitro in Chinese hamster ovary cells with and without activation, and both benomyl and MBC caused increased incidences of micronuclei in polychromatic erythrocytes in mice bone marrow. In other studies performed to assess gene mutations equivocal results were obtained. That is, MBC was weakly positive in one mouse lymphoma test (L5178Y $TK^{+}/-$) but was negative in a second test, Benomyl and MBC produced both positive and negative results in different Ames tests, and both compounds produced negative results in Chinese hamster ovary cells (HGPRT). Finally, negative results were obtained for DNA repair with Benomyl and MBC in several studies in primary mouse and rat hepatocyte cultures. The TPRC concluded that these results, when taken together, indicated that both Benomyl and MBC have weak mutagenic activity that is primarily attributable to adverse effects on the cellular spindle apparatus. This pattern correlates well with teratogenic and spermatotoxic effects also observed with other benzimidazole compounds. Correlation, or the lack there of, with oncogenicity has not been demonstrated conclusively.

e) Structure-Activity Correlations

Both Benomyl and MBC bear a close structural resemblance to several other benzimidazole compounds that are suspect oncogens (e.g., fenbendazole and albendazole). The potential oncogenic effects of these compounds are currently under review by the Center for Veterinary Medicine, Food and Drug Administration and were recently discussed in a Congressional Subcommittee Hearing (reference: Human Food Safety and the Regulation of Animal Drugs; 27th Report by the Committee on Government Operations, December 31, 1985. Union Calendar, No. 274. Intergovernmental Relations and Human Resources Subcommittee. Ted Weiss, New York, Chairman; pp. 1-115). In the case of fenbendazole, a high incidence of liver nodular hyperplasia and low incidences of liver neoplastic nodules, adenomas and carcinomas were observed in rats. In the case of albendazole, histiocytic sarcomas were observed in rats and uterine polyps were observed in rats and mice. The TPRC was aware that final decisions regarding the classification of these chemicals as oncogens had not yet been made by the FDA.

(3) Risk Assessment:

The Agency has reviewed oncogenicity studies for benomyl and its metabolite MBC, and concluded that these data provide limited evidence of oncogenicity for these chemicals in male and female mice. According to EPA Proposed Guidelines for Carcinogen Risk Assessment (November 23, 1984, 49 FR 46294), benomyl has been classified as a Group C oncogen, that is, possibly a human oncogen.

The Toxicology Peer Review Committee (TPRC) chose to classify benomyl and MBC in Group C (limited evidence of carcinogenicity) for the following reasons:

a) The oncogenic responses observed with benomyl and its metabolite MBC were confined solely to the mouse liver.

b) Neither benomyl nor MBC were oncogenic in ChR-CD rats.

c) Although oncogenic responses were seen in more than one study, each study had similar dosing ranges and the test chemicals were administered in the feed. Furthermore, the liver tumors produced by benomyl and MBC were observed in two genetically related strains of mice (CD-1 and SPF Swiss), whereas no liver tumors were produced by MBC in a genetically unrelated strain of mouse [HOE NMRKf (SPF-71)].

d) Benomyl and MBC produced weak mutagenic effects consistent with spindle poison activity rather than gene mutation or DNA repair activity. The TPRC noted that this pattern of mutagenic activity correlates well with teratogenic and spermatotoxic effects. Correlation, or lack there of, with oncogenicty has not been demonstrated.

The TPRC concluded that the data available for benomyl and its primary metabolite MBC, provide limited evidence of oncogenicity for both chemicals in male and female mice. Criteria contained in the proposed EPA Guidelines (CFR, November 23, 1984) for classifying a carcinogen in either Category B_2 or C were considered. Benomyl and MBC met some of the critieria specified for the B_2 classification. That is, both benomyl and MBC produced an increased incidence of malignant or combined malignant and benign tumors in genetically related strains of mice (CD-1 and SPF Swiss) and in multiple experiments. Furthermore, MBC did produce an unusual type of liver tumor (hepatoblastoma) but only in male SPF Swiss mice.

Despite these considerations, the Toxicology Peer Review Committee decreased the classification to Group C (limited evidence of carcinogenicity) for the following reasons: (1) Neither benomyl nor MBC produced tumors in the rat. (2) The oncogenic responses observed with benomyl and MBC were confined solely to the mouse liver in 2 genetically related strains of mice (CD-1 and SPF Swiss). (3) No liver tumors were produced by MBC in a genetically different strain of mouse [HOE NMRKf (SPF-71)]. (4) The genetic toxicity of benomyl and MBC is minimal, that is, they producod weak mutagenic effects consistent with spindle poison activity rather than gene mutation or DNA repair activity. Because of these factors, the Committee determined that there was insufficient evidence for the B_2 category and therefore, in conformity with the EPA Guidelines noted above, classified both benomyl and its primary metabolite, MBC, as Group C (possible human) carcinogens.

(4) Dietary Risk:

a) Teratogenesis

The NOEL for teratogenic effects is 30 mg/kg/day based on microphthalmia in the Charles River rat. The distribution of exposure for the population at risk (females greater than 13 years of age) was obtained using the Agency's Tolerance Assessment System (TAS) [Saunders et al., 1986] based on the assumption that residues are present at tolerance levels. The weighted-average daily exposure, which represents exposure for 50% of the individuals at risk, is 0.04 mg/kg/day. This results in a margin of safety (MOS) of approximately 750. Forty-four percent of the women in this risk category had a MOS greater than 1,000. Three percent had a MOS of 200. The remaining fifty-three percent had a MOS which ranged from 200 to 1,000.

b) Spermatotoxic Effects

The NOEL of 62.5 mg/kg/day for spermatogenic effects from the chronic dog feeding study was used for dietary risk. Using the detailed acute analysis of TAS and assuming residues for every commodity are present at tolerance levels, a weighted-average daily exposure of 0.035 mg/kg/day was obtained. This results in a MOS of approximately 1,800 for males.

The distribution of exposure for the population at risk (males greater than 13 years of age) was obtained using the TAS analysis. No individuals had exposures greater than 0.225 mg/kg/day. The MOS was approximately 280 for the individual with the highest exposure.

c) Oncogenic Effects

In the PD-4, the Agency performed a quantitative oncogenic risk assessment for benomyl. That assessment was based on a body weight to body weight species conversion. Present Agency guidelines call for a surface weight species correction unless a biological reason for using a different conversion exists. Therefore, an updated risk assessment was performed. The Agency will request comments from the Scientific Advisory Panel (SAP) on the weight the Agency should place on a quantitative risk assessment for benomyl.

The 95% upper confidence level potency estimator, Q_1^*, for oncogenicity is 3.9×10^{-3} $(mg/kg/day)^{-1}$. The exposure which results from the TMRC is 0.0337 mg/kg/day. When a correction is made for the percent of the crop treated, the exposure would be 0.0074 mg/kg/day. The TMRC is based on tolerance levels and provides a conservative estimate, moreover, when actual residue data are available the risks may be several orders of magnitude lower. The resultant risk would be 10^{-4}(C) (uncorrected) and 10^{-5}(C) (corrected for percent of crop treated) respectively. This risk is the same order of magnitude as the risk calculated in the PD-4.

(5) Applicator Exposure and Risk:

Dermal exposure to benomyl is minimal because its absorption is not significant. Percent of benomyl absorbed/unit time decreases with increasing dose in a non-linear fashion. Absorption increased with the duration of exposure to a maximum at about four hours.

This is based on a study (GS0119-014) in which four rats/time point/dose were treated dermally (greater than 16% of their surface area) with Benlate® (50% a.i.). The durations of exposure were 0.5, 1, 2, 4, and 10 hours; doses tested were 0.2, 2, 20, and 200 mg of ^{14}C-Benlate/rat (0.1, 1, 10, and 100 mg, respectively of benomyl). The concentration of benomyl in the blood increased (nonlinear) with increasing dose. The percent of administered dose of benomyl in the urine decreased (nonlinear) with increasing dose and increased (nonlinear) with duration. The percent absorption also had a nonlinear decrease with increasing dose and a nonlinear increase with duration. The percent absorbed ranged from 0.031 (high dose) to 3.518 (low dose) for the maximum exposure of 10 hours. By 10 hours, 96 to 99 percent of the absorbed dose at all treatment levels had been excreted in the urine.

For mixing, loading and application, it was concluded that the worst case (maximum) dermal exposure would not result in dermal absorption of more than 0.006 mg/kg/day.

Inhalation exposure is the primary route of applicator exposure to benomyl. The worst case job related exposure would be for mixer/loaders for grapes/fruit crops with aerial application (i.e. 0.35 mg/kg/day without a dust mask). This exposure would result in a MOS of 21 for spermatogenic inhibition and a MOS of 90 for teratogenic effects. The exposure would decrease by 90% when the mixer/loader wears a dust mask, thus increasing the MOS to 210 and 900.

The oncogenic risk to mixer/loaders involved in aerial application without respiratory protection ranges from less than 10^{-6} (C) to 10^{-4} - 10^{-5} (C). If a dust mask is used, the risk ranges from 10^{-6} (C) to 10^{-5} (C).

b. Benefits. An assessment of the benefits of benomyl was performed in 1982 in connection with the Special Review of benomyl. That assessment examined the use patterns of the chemical and the available alternatives. Data submitted since 1982 confirmed the basic conclusions of the 1982 assessment. The following is a result of the 1982 assessment.

Benomyl is a broad spectrum fungicide that controls a wide variety of plant diseases in field and vegetable crops, rice, tree fruit and nut crops, greenhouse, ornamentals, and turf sites. It is also used as a postharvest dip for fruits.

Benomyl is applied aerially, by ground equipment, with liquid fertilizers, and over-the-top in tank mixes. Benomyl is also widely tank mixed with non-benzimidazole fungicides to prevent the emergence of benomyl-resistant plant pathogens.

Alternative pesticides are registered for most of the crops on which benomyl is used. Generally these alternatives are also considered effective. However, benomyl is more efficacious against plant diseases than alternatives during seasons of average to heavy rainfall when other conditions that are conducive to disease development exist. Due to benomyl's systemic properties and broad activity spectrum, the number of preharvest treatments needed for crop disease control are also greatly reduced.

Benomyl and certain benzimidazole fungicides have provided rice growers with effective control agents against foliar and head diseases of rice.

Refer to Tables A, B, and C, below for the list of economic data and alternatives for benomyl.

For a more detailed benefit analysis on benomyl, refer to Section III, "Qualitative Benefits Analysis" in the PD-4: 44 to 50.

Table A Summary of the Economic Importance of Benomyl *

Site	Extent of Use Units Treated	 % of U.S.	Quantity Benomyl Applied (Lbs. Active Ingredient)	Availability of Economic Alternatives	Economic Impact
Fruits and Nuts					
Apples, Preharvest	90,000-150,000 acres	18-31	75,000-187,500	Captan, dichlone, dodine, sulphur, captafol, dinocap ferbam, maneb + dinocap	Minimum of $.3-.8 million per year in dry years. $1.4-2.7 million in wet years plus production losses ($1.8-3.0 million for every 1% loss). Minor consumer impacts.
Postharvest	2.02 million tons	50	10,000	TBZ	$104,000/year plus losses due to increased storage rot ($6.25 million for each 1% loss).
Citrus, Preharvest					
Oranges	160,000 acres	20	120,000	Oil, coppers, captafol	$1.4 million total citrus; mostly fruit downgrading and increased shipping losses of grapefruit for the Japanese market.
Grapefruit	35,000 acres	18	52,500		
Other	100,000 acres	6	8,500		
Postharvest	7.9 billion lbs.	26	5,000 - 6,000	TBZ is the major alternative; SOPP + diphenyl often used on exported fruit.	$606,000 per year but increased losses due to decay in shipping and marketing. Decay loss unknown but each 1% loss = $4.6 million. Some retail price increases and home fruit decay problems.
Grapes	100,000-125,000 acres	12-16	78,000-110,000	Captan, folpet, maneb, coppers, dicloran	$1.4-3.9 million per year plus production losses, especially in wet growing seasons. Production losses would increase the retail prices for grapes and raisins.
Pineapples	10,770 tons	15% of fresh crop in Hawaii	NA (Not Available)	Captan and SOPP for fresh fruits; captan and captafol for planting stock	$1.92 million loss in production. 2.1% reduction in HI crop, further loss of 1% of fresh supply. Retail price increases for fresh and canned fruit.

Table B

Site	Extent of Use		Quantity Benomyl Applied (Lbs. Active Ingredient)	Availability of Economic Alternatives	Economic Impact	
	Units Treated	% of U.S.			DRY YEARS	WET YEARS
					(In Millions of dollars)	
Stone Fruits						
Preharvest						
Peaches	150,000-200,000 acres	50-75	112,500-187,500	Captan, sulphur, maneb captafol, dodine	3.39-6.57	13.11-19.07
Nectarines	9,200-13,600 acres	50-73	7,400-11,600		0.3-0.45	1.28-1.88
					Production losses in wet season would increase retail prices	
Postharvest	NA	NA	NA	Dichloran	Not quantified. Current losses of 2 to 3% per year ($6-9 million) would be exceeded by an unknown amount. Probable retail price increases (amount unknown).	
Almonds	NA	NA	63,000	NA	NA	
Avocados	310 acres	5 (FL)	1,600	Copper (poor alternative)	NA	
Bananas	NA	Not grown in US	200,000 (Central America)	Mancozeb, maneb thiophanate methyl	NA	
Berries	NA	Blueberries East 90 West 50 Raspberries East 30-60 West 50-80	71,911	Ferbam, captan, lime sulphur, dinocap	NA	
Macadamia nuts	3,200 acres	80	100 - 2,400	Difolatan provides equivalent control	NA	
Mangoes	800 acres	50 (FL)	6,000	Copper is less effective	NA	
Pears	NA	NA	10,928	Dodine, dinocap, sulfur	NA	
Pecans	100,000 acres	29	100,000	Dodine and triphenyltin hydroxide	NA	

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Table C

Site	Extent of Use Units Treated	 % of U.S.	Quantity Benomyl Applied (Lbs. Active Ingredient)	Availability of Economic Alternatives	Economic Impact
Field Crops					
Peanuts	332,000 acres	22	150,500	Chlorothalonil, maneb, difolatan mancozeb, triphenyltin hydroxide coppers, others	NA
Rice	442,300 acres	22	299,300	None	$14.94 million per year or $23 to 30 income loss per impacted acre. Little or no consumer impact.
Soybeans	1,522,000 acres	2.6	761,000	Thiabendazole	NA
Sugar Beets	NA	NA	13,500	NA	NA
Sugar Cane-Seed pieces	NA	NA	26,000	None	NA
Wheat	NA	NA	11,150	None	NA
Ornamentals					
Ornamentals	NA	NA	125,000	Dinocap, chlorothalonil, captan zineb, maneb, thiram, thiophanate methyl, folpet, mancozeb, coppers, sulphur, metiram, nabam, others	NA
Turf	NA	NA	150,000	Thiophanate, thiophanate-methyl, cadmium, cycloheximide, PCNB, chlorothalonil, thiram, mancozeb, others	NA
Vegetables					
Mushrooms	174 million lbs.	50	11,034	Zineb	NA
Vegetables	NA	NA	150,500	Folpet, maneb, chlorothalonil, dinocap, captafol, anilazine, others.	NA
TOTAL			2.47 to 2.71 million 1/		Greater than $26.37 million to $52.34 million. 2/

* Source: USDA (1978), USDA/US EPA (1979), US EPA (1980), US EPA (1981).

1/ Limited to domestic usage only. Benomyl use for Central American banana production is not considered in the overall total.

2/ Aggregated economic impacts are for the production/processing levels of the market and are limited to the following sites: apples (pre- and postharvest), citrus (pre- and postharvest), grapes, pineapples, stone fruits (pre- and postharvest), and rice.

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2. Tolerance Reassessment

Tolerances have been established for residues of benomyl on a wide range of raw agricultural products listed in 40 CFR 180.294. The toxicity data considered in support of establishing an acceptable daily intake (ADI) for benomyl of 0.05 mg/kg/day are the following:

a. In a two-year rat feeding study, benomyl showed a No-Observed-Effect-Level (NOEL) of 2,500 ppm (125 mg/kg/day). There were no treatment related effects observed in the study. A maximum tolerated dose (MTD) was not established.

b. In a two-year dog feeding study, benomyl showed a NOEL of 500 ppm (12.5 mg/kg/day). The Lowest-Effect-Level (LEL) was 2,500 ppm (62.5 mg/kg/day) based on biochemical alterations, hepatic cirrhosis, decreased weight gain and lower food consumption.

c. In a mouse teratology study, benomyl has been shown to cause certain anomalies: cleft palate, supernumerary ribs, and subnormal vertebral centrum. The NOEL was 50 mg/kg/day and the LEL, based on teratogenic effects, was 100 mg/kg/day.

d. In a 3 generation study on male and female rats, benomyl produced decreased pup weanling weights at 500 ppm (25 mg/kg/day) and higher dosage rates. The NOEL was 100 ppm (5 mg/kg/day) and the LEL, based on decreased pup weanling weights, was 500 ppm (25 mg/kg/day).

e. In rat teratology studies, benomyl was shown to cause a significant increase in microphthalmia, anophthalmia, distended lateral ventricles, hydrocephaly and decreased fetal weight. The NOEL was 30 mg/kg/day and the LEL was 62.5 mg/kg/day based on microphthalmia and decreased fetal weight.

The three generation reproduction study in the rat was determined to be the most sensitive study for benomyl. Therefore, the ADI for humans based on this study was calculated to be 0.05 mg/kg/day, based on a NOEL of 5.0 mg/kg/day, and a safety factor of 100. The maximum permissible intake (MPI) for a 60 kg adult is: 0.05 mg/kg/day x 60 kg = 3 mg/day.

To date the tolerances granted have accounted for approximately 70.0% of the ADI with a theoretical maximum residue contribution (TMRC) to the daily diet of approximately 2.0 mg/day (for an average 1.5 kg daily diet).

The potential impact of each new use on the ADI and other toxic end points, including oncogenicity, teratogenicity and adverse spermatogenic effects will be considered before additional tolerances are granted.

Presently, the adequacy of the established tolerances for the combined residues of benomyl and MBC (calculated as benomyl) in certain raw agricultural commodities (RAC's) and food/feed commodities cannot be determined until the required metabolism studies in plants and animals, residue and processing studies have been submitted and reviewed.

Pending receipt of the additional studies, the Agency will evaluate new uses and new tolerances on a case-by-case basis. If the incremental risks are not significantly increased, the Agency will continue to establish new tolerances.

D. REGULATORY POSITION AND RATIONALE.

Based on the review and evaluation of all available data and other relevant information on benomyl, the Agency has made the following determinations:

1. The Agency will not place benomyl and its metabolite MBC into Special Review [Section 162.11(a) of CFR 40].

   Rationale: Benomyl was previously placed in Special Review by the Agency in December, 1977, because of its mutagenic, teratogenic, reduced spermatogenic, and acute aquatic effects. Prior to the publication of the final benomyl regulatory decision, new studies were received by the Agency, indicating that benomyl and its major metabolite, methyl-2-benzimidazole carbamate (MBC) were carcinogenic.

   Benomyl has been classified as a Group C oncogen (possible human oncogen). The current risk analysis is of the same order of magnitude as those calculated in the PD-4.

   Although benomyl and its metabolite MBC are both associated with liver tumors in Swiss and Swiss derived mice (CD-1), MBC is not associated with liver tumors in the NMRKf strain of mouse, which has a low background incidence of liver tumors. Also benomyl and MBC were not oncogenic in the rat and are not genotoxic. In addition, only one type of liver tumors (hepatocellular carcinomas) occurred in both sexes of the mice.

   The Agency concluded that benomyl and its metabolite, MBC, are spindle poisons which could result in aneuploidy and nondisjunction. However, the impact of this effect to human health could not be fully assessed at that time. The state of the art for mutagenic risk assessment has not changed significantly since the regulatory decision in 1982. The Agency is still unable to perform a mutagenic risk assessment for these compounds.

   In a mouse teratology study, benomyl has been shown to cause cleft palate, supernumerary ribs, and subnormal vertebral centrum. The NOEL was 50 mg/kg/day and the LEL was 100 mg/kg/day.

   In rat teratology studies, benomyl was shown to cause a significant increase in microphthalmia, anophthalmia, distended lateral ventricles, hydrocephaly and decreased fetal weight. The NOEL of 30 mg/kg/day for teratogenic effects in the PD-4 was considered to be provisional until an effect level for microphthalmia in rats could be determined. The Agency has since reviewed a rat teratology study with special emphasis on ocular effects and has determined that the NOEL for microphthalmia is 30 mg/kg/day and the LEL is 62.5 mg/kg/day.

The spermatotoxic risk for benomyl has not changed since the 1982 regulatory decision. Therefore, in order for the MOS for aerial mixer/loaders to be acceptable, a dust mask must be worn while mixing and loading as required in the 1982 decision.

After considering dietary and applicator exposures to benomyl, the Agency has determined that inhalation exposure is the primary route of exposure to benomyl. Mainly, workers who mix and load benomyl for aerial application have the highest exposure.

In the PD-4, the Agency required the use of a dust mask by persons who mix and load benomyl for aerial application. The Agency will maintain the identical protective mask requirement in this registration standard.

The Agency has concluded that the risks to humans posed by benomyl are minimal and of the same magnitude as in the 1982 decision. The Agency has also reviewed the benefits of benomyl and has concluded that the benefits have not changed significantly since the 1982 decision. The benefits of benomyl outweigh its risks with the protective measures required on the label. —Hence initiation of an additional special review is not necessary at this time.

Concerns about the acute effects of benomyl on aquatic species are discussed below.

2. The Agency does not intend to establish new food additive regulations pursuant to to Section 409 of the Federal, Food, Drug, and Cosmetic Act (FFDCA). The Agency is deferring action on the presently established food additive regulations until receipt and evaluation of comments in response to a Federal Register notice discussing this issue. This notice is scheduled for issuance in May, 1986.

   Rationale: The Delaney Clause in Section 409 of the FFDCA bars the establishment of food additive regulations for substances which induce cancer in man or test animals, with exceptions which do not apply here. Benomyl and its MBC metabolite have been found to produce an oncogenic response in test animals. The Agency will be soliciting comments on Delaney clause issues regarding benomyl and other pesticides which have produced positive oncogenic rsponses in chronic animal studies.

3. The Agency will announce in a Federal Register Notice, the availability of this interim Benomyl Registration Standard to all interested persons for comment.

   Rationale: The Agency will ask for public comments on its classification of benomyl as a Group C oncogen. The Agency emphasizes that the toxicology data base for benomyl is almost complete. Only the subchronic inhalation and general metabolism studies are required.

4. The Agency will submit this interim benomyl standard to the Scientific Advisory Panel (SAP) for discussion of benomyl's classification as a Group C oncogen.

   Rationale: Although the Agency had previously submitted the Benomyl PD-4 to SAP, it did not at that time classify oncogens as presently required by the proposed Agency cancer guidelines [Federal Register, Part VII, 49 (227): 46294-46301]. The Agency has included a risk assessment for oncogenicity in this interim benomyl standard. The Agency will request comments from SAP on the classification of benomyl and the weight the Agency should place on this risk assessment. After receipt of comments by the SAP and interested members of the public, the Agency will make any appropriate revisions to the interim Benomyl Registration Standard.

5. The Agency will approve a new use for a Section 3 or 24(c) registration for benomyl on a case-by-case basis.

   Rationale: Extensive data gaps exist in the areas of environmental fate, residue chemistry and ecological effects. Until the Agency reviews the data required in this standard, it cannot fully assess the potential hazards of increased and/or new uses of benomyl.

6. The Agency will consider Section 18 Exemptions for benomyl on a case-by-case basis.

   Rationale: Emergency exemption to use benomyl by a Federal or State agency will only be granted after stringent review of each pest outbreak shows that the temporary application of benomyl will not cause adverse effects to non-target species and the ecosystem.

7. The Agency is requiring a rice field monitoring study using caged catfish in various sites and residue analyses with a limit of detection of 1.0 ppb to determine the degree of risk due to benomyl use.

   Rationale: The monitoring study of benomyl residues in rice field water submitted to the Agency as required by the 3(c)(2)(B) letter was found to be inadequate. The Agency is concerned about benomyl residue levels of 1.0 ppb. A detection level of 20 ppb for the analytical methodolgy was used in the monitoring study. Because this level of detection is not adequate to alleviate concern for aquatic organisms, a new monitoring study is required.

8. The Agency is requiring endangered species labeling on benomyl EPs registered for use on soybeans. Currently, the Agency is not requiring endangered species labeling for use on rice, but mollusk data are being required (See Part II, Section C).

   Rationale: Benomyl was reviewed as part of the soybean cluster for endangered species implications and in light of a previous consultation with the Office of Endangered Species, Department of the Interior, for an herbicide used on rice. Review under the soybean cluster showed that two endangered ictalurid species reside in areas where soybeans may be grown. In order to protect these species from harm, endangered species labeling is required.

   The Fat Pocketbook Pearly mussel is associated with rice culture. However, due to the absence of mollusk data, no risk assessment can be conducted for this species at this time. Therefore, endangered species labeling associated with the rice use is not required. Instead, the Agency is requiring data which will allow a risk assessment to be conducted on this mussel.

9. The Agency is not requiring a reentry interval for currently registered uses of benomyl.

   Rationale: The acute toxicity for benomyl is low (Categories III and IV) except for eye irritation (Category II) which was reversible by 11 days. Additionally, exposure and the resultant risks to field workers are not expected to be significant. Therefore, no reentry interval is required.

10. The Agency is imposing labeling requirements which prohibit grazing on treated wheat hay (forage), and grazing and feeding of livestock on forage and hay of barley, oats, rye and wheat following seed treatment (See Part II, Section C).

    Rationale: The Agency is concerned that the grazing of livestock on treated wheat hay, and the grazing and feeding of livestock on forage and hay of barley, oats, rye and wheat following seed treatment may result in illegal residues in those animals. Therefore, until data are received alleviating the Agency's concerns, the Agency is imposing these restrictions.

11. The Agency is imposing labeling restrictions on rotational and irrigated crops. The extent of the restrictions will be reconsidered when additional data are submitted and reviewed (See Part II, Section C).

Rationale: The Agency lacks data at the present time to determine whether planting an unregistered crop in benomyl treated soil or irrigating an unregistered crop with water from benomyl treated rice fields would result in illegal residues in these unregistered crops. In the absence of the necessary data to make this determination, the restriction will serve to protect the public from impermissable residues in food and feed. In addition, this restriction will protect subsequent planted crops from possible effects due to persistent residues of benomyl in the soil and the irrigation water.

12. Available data are insufficient to fully assess the environmental fate of benomyl and exposure of nontarget organisms to benomyl.

Rationale: In the ecosystem, the available information indicates that benomyl dissipates (95%) in a variety of soils from fine sand to silty clay loam soils in less than 3 months. In the laboratory, the mobility of benomyl and MBC in silt loam and sandy loam soils was found to be low.

In order to better define the environmental fate of benomyl, the Agency is requiring studies on benomyl in soil metabolism, mobility, soil/aquatic dissipation, and accumulation studies (except for aquatic non-target organisms).

13. The Agency has reviewed five environmental fate studies for benomyl submitted under Section 3(c)(2)(B) and concluded that benomyl and MBC have a low potential for ground water contamination.

Rationale: Both benomyl and MBC do not leach significantly in soil and are not likely to contaminate ground water supplies when applied properly for agricultural purposes.

14. The Agency will issue registrations for substantially similar products. However new uses will be issued only on a case-by-case basis after considering the oncogenic risks and other risks to applicators and dietary risks to the general public.

Rationale: Section 6 of FIFRA authorizes the Administrator to cancel a pesticide registration if he determines that the pesticide will cause unreasonable adverse effects on the environment. Based on available data, the Administrator has not made such a determination on benomyl. The Administrator has authority under FIFRA sections 3(c)(2)(B) and (3)(c)(7) to require registrants and applicants for registration to provide data needed to support new or continuing registrations.

While the data gaps are being filled, currently registered manufacturing-use products (MPs) and end-use products (EPs) containing benomyl as the sole active ingredient may be sold, distributed, formulated and used in the United States, subject to the terms and conditions specified in this Standard. Registrants must provide or agree to develop additional data, as specified in Table A of Appendix I, in order to maintain existing registrations.

Issuance of this Standard provides a mechanism for identifying data needs. These data will be reviewed and evaluated and the Agency will determine if the data will affect the registration of benomyl.

PART II. REQUIREMENTS FOR REGISTRATION

This Part of the Registration Standard discusses the criteria for registration, acceptable ranges and limits, and specific labeling requirements. The Appendices contain information on data requirements and instructions for submitting necessary data and information to the Agency.

A. CRITERIA FOR REGISTRATION UNDER THIS STANDARD.

To be covered by this Standard, MPs must contain benomyl as the sole active ingredient, bear required labeling and conform to the product composition, acute toxicity limits and use pattern requirements listed in Section B.

The applicant for registration or reregistration of products subject to this Standard must comply with all terms and conditions described in it. This includes making a commitment to fill data gaps on a schedule specified by the Agency. Applicants for registration under this Standard must follow the instructions contained herein and complete and submit the appropriate forms within the time specified.

B. ACCEPTABLE RANGES AND LIMITS.

1. Product Composition Standard. Technical grade products must contain at least 95.0 percent benomyl as the sole active ingredient. Each MP formulation proposed for registration must be fully described with appropriate certification of limits. In addition, the active ingredient must be substantially similar to that in currently registered technical products. Any MPs not meeting these requirements will be considered a new product and will not be registered under this Standard.

2. Acute Toxicity Limits. The Agency will consider registration of technical grade MPs containing benomyl when the acute toxicity categories are no higher than Category II. The labeling of any registered products must bear the appropriate precautionary statements.

3. Use Patterns. To be registered under this Standard, MPs containing benomyl must be labeled for reformulation into end-use products which are systemic fungicides for use on a variety of field and vegetable crops, rice, tree fruit and nut crops, greenhouse, domestic outdoor(ornamental) and turf sites. Benomyl is also used as a postharvest dip for fruits; a preplant dip for seed pieces of pineapple and sugar cane, and for strawberry transplants. [See the Benomyl EPA Index to Pesticide Chemicals under Appendix III].

C. REQUIRED LABELING.

The required label statements must appear on the labels of all products in channels of trade within two years [April 30, 1988] of issuance of this Standard. After review of data to be submitted under this Standard, the Agency may impose additional label requirements.

All products must bear appropriate labeling as specified in 40 CFR 162.10. Specific information regarding 40 CFR 162.10 label requirements is included in Appendix II.

1. Manufacturing-Use Product Statements

All products intended for formulation into EPs must bear the following environmental hazard statement:

"This product is toxic to fish."

"Do not discharge effluent containing this product directly into lakes, streams, ponds, estuaries, oceans or public waters unless this product is specifically identified and addressed in a National Pollutant Discharge Elimination System (NPDES) permit. Do not discharge effluent containing this product into sewer systems without previously notifying the sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the Environmental Protection Agency".

2. End-Use Product Statements

The following human hazard statement must appear on all EP labels:

> "A cloth or disposable mask must be worn by all workers engaged in mixing and loading benomyl for aerial application."

The following environmental hazard statement must appear on all EPs registered for non-aquatic uses:

> "This pesticide is toxic to fish. Do not apply directly to water. Drift and runoff from treated areas may be hazardous to fish in adjacent areas. Do not contaminate water by cleaning of equipment or disposal of wastes."

The following environmental hazard statement must appear on all EPs registered for aquatic uses (e.g. rice):

> "This pesticide is toxic to fish. Aquatic organisms may be killed at recommended application rates. Do not contaminate water by cleaning of equipment or disposal of wastes."

The following restriction on rotational crops and use of irrigation water must appear on the label of all EPs:

> "Do not use benomyl on rice fields in which crayfish and catfish farming are included in the cultural practices. Do not use water containing benomyl residues from rice cultivation to irrigate crops unless benomyl is registered for use on those crops. Do not plant food and feed crops in benomyl treated fields for 18 months after the last application unless benomyl is registered for use on those crops."

The following restriction on grazing and feeding must appear on the label of all EPs:

> "Grazing or feeding livestock is prohibited on forage and hay of benomyl treated wheat, and on forage and hay of barley, oats, rye and wheat following seed treatment."

The following information on endangered species must appear on the label of all EPs registered for use on soybeans:

> "ENDANGERED SPECIES RESTRICTIONS
>
> The use of any pesticide in a manner that may kill or otherwise harm an endangered or threatened species or adversely modify their habitat is a violation of federal laws. The use of this product is controlled to prevent death or harm to endangered or threatened species that occur in the following counties or elsewhere in their range.

STATE Species	COUNTY
OHIO Scioto madtom	CHAMPAGNE FRANKLIN LOGAN MADISON PICKAWAY UNION
TENNESSEE Yellowfin madtom	CLAIBORNE HANCOCK
VIRGINIA Yellowfin madtom	LEE RUSSELL SCOTT

> Before using this pesticide in these counties you must obtain the EPA Cropland Endangered Species Bulletin (EPA/ES-CROP). The use of this pesticide is prohibited in these counties unless specified otherwise in the Bulletin. The EPA Bulletin is available from either your County Agricultural Extension Agent, the Endangered Species Specialist in your State Wildlife Agency Headquarters, or the appropriate Regional Office of either the U.S. Fish and Wildlife Service (FWS) or the U.S. Environmental Protection Agency (EPA). THIS BULLETIN MUST BE REVIEWED PRIOR TO PESTICIDE USE."

D. PRODUCTS SUBJECT TO THIS STANDARD

All products containing one or more of the pesticides identified in Part I.A. are subject to certain requirements for data submission or changes in composition, labeling or packaging of the product. The applicable requirements depend on whether the product is a manufacturing or end use product and whether the pesticide is the sole active ingredient or one of multiple active ingredients.

Products are subject to this Registration Standard as follows:

1. Manufacturing use products containing this pesticide as the sole active ingredient are subject to:

   a. The restrictions (if any) upon use, composition, or packaging listed in Part I, if they pertain to the manufacturing use product.

   b. The data requirements listed in Tables A and B[2]

   c. The labeling requirements specified for manufacturing use products in Part II.

   d. Administrative requirements (application forms, Confidential Statement of Formula, data compensation provisions) associated with reregistration.

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[2] Data requirements are listed in the three Tables in Appendix I of this Registration Standard. The Guide to Tables in that Appendix explains how to read the Tables.

Table A lists generic data requirements applicable to all products containing the pesticide subject to this Registration Standard. Table B lists product-specific data applicable to manufacturing use products. The data in Tables A and B need not be submitted by a producer who is eligible for the formulator's exemption for that active ingredient.

Table C lists product-specific data applicable to end use products. The Agency has decided that, in most cases, it will not require the submission of product-specific data for end use products at this time. Therefore most Registration Standards do not contain a Table C.

2. Manufacturing use products containing this pesticide as one of multiple active ingredients are subject to:

The data requirements listed in Table A.

3. End use products containing this pesticide as the sole active ingredient are subject to:

a. The restrictions (if any) upon use, composition, or packaging listed in Part I if they pertain to the end use product.

b. If eligible for the formulator's exemption[3], the data requirements listed in Table C.

c. If not eligible for the formulator's exemption, the data requirements listed in Table A and the data requirements listed in Table C.

d. The labeling requirements specified for end use products in Part II.

4. End use products containing—this pesticide as one of multiple active ingredients are subject to:

a. If not eligible for the formulator's exemption, the date requirements listed in Tables A and C.

b. If eligible for the formulator's exemption, the data requirements listed in Table C.

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[3] If you purchase from another producer and use as the source of your active ingredient only EPA-registered products, you are eligible for the formulator's exemption for generic data concerning that active ingredient (Table A) and product-specific data for the registered manufacturing use product you purchase (Table B).

Two circumstances nullify this exemption:

1) If you change sources of active ingredient to an unregistered product, formulate your own active ingredient, or acquire your active ingredient from a firm with ownership in common with yours, you individually lose the exemption and become subject to the data requirements in Table A.

2) If no producer subject to the generic data requirements in Table A agrees to submit the required data, all end use producers lose the exemption, and become subject to those data requirements.

E. REQUIREMENT FOR SUBMISSION OF GENERIC DATA

This portion of the Registration Standard is a notice issued under the authority of FIFRA sec. 3(c)(2)(B). It refers to the data listed in Table A, which are required to be submitted by registrants to maintain in effect the registration of products containing this active ingredient.[4]

1. What are generic data?

Generic data pertain to the properties or effects of a particular active ingredient. Such data are relevant to an evaluation of all products containing that active ingredient regardless of whether the product contains other ingredients. (unless the product bears labeling that would make the data requirement inapplicable).

Generic data may also be data on a "typical formulation" of a product. "Typical formulation" testing is often required for ecological effects studies and applies to all products having that formulation type. These are classed as generic data, and are contained in Table A.

2. Who must submit generic data?

All current registrants are responsible for submitting generic data in response to a data request under FIFRA sec. 3(c)(2)(B) (DCI Notice). EPA has decided, however, not to require a registrant who qualifies for the formulator's exemption (FIFRA sec. 3(c)(2)(D) and § 152.85) to submit generic data in response to a DCI notice if the registrant who supplies the active ingredient in his product is complying with the data request.

If you are not now eligible for a formulator's exemption, you may qualify for one if you change your source of supply to a registered source that does not share ownership in common with your firm. If you choose to change sources of supply, the Confidential Statement of Formula must identify the new source(s) and you must submit a Formulator's Exemption Statement form.

If you apply for a new registration for products containing this active ingredient after the issuance of this Registration Standard, you will be required to submit or cite generic data relevant to the uses of your product if, at the time the application is submitted, the data have been submitted to the Agency by current registrants. If the required data have not yet been submitted, any new registration will be conditioned upon the new registrant's submission or citation of the required data not later than the date upon which current registrants of similar products are required to provide such data. See FIFRA sec. 3(c)(7)(A). If you thereafter fail to comply with the condition of that registration to provide data, the registration may be cancelled (FIFRA sec. 6(e)).

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[4] Registrations granted after issuance of this Standard will be conditioned upon submission or citation of the data listed in this Registration Standard.

3. What generic data must be submitted?

You may determine which generic data you must submit by consulting Table A. That table lists the generic data needed to evaluate current uses of all products containing this active ingredient, the uses for which such data are required, and the dates by which the data must be submitted to the Agency.

4. How to comply with DCI requirements.

Within 90 days of your receipt of this Registration Standard, you must submit to EPA a completed copy of the form entitled "FIFRA Section 3(c)(2)(B) Summary Sheet" (EPA Form 8580-1, enclosed) for each of your products. On that form you must state which of the following six methods you will use to comply with the DCI requirements:

a. You will submit the data, and either--

(1) Submit the existing data that you believe will satisfy the data requirements, or

(2) State that you will secure the data or have made a contract to have any necessary studies completed within the applicable time period.

b. You have entered into an agreement with one or more registrants to jointly develop (or share in the cost of developing) the data, but will not be submitting the data yourself. If you use this method, you must state who will submit the data on which you will rely. You must also provide EPA with documentary evidence that an agreement has been formed which allows you to rely upon the data to be submitted. Such evidence may be: (1) your letter offering to join in an agreement and the other registrant's acceptance of your offer, (2) a written statement by the parties that an agreement exists, or (3) a written statement by the person who will be submitting the data that you may rely upon its submission. The Agency will also require adequate assurance that the person whom you state will provide the data is taking appropriate steps to secure it. The agreement to produce the data need not specify all of the terms of the final arrangement between the parties or a mechanism to resolve the terms.

c. You have attempted to enter into an agreement to jointly develop data, but no other registrant has accepted your offer. You request that EPA not suspend your registration for non-compliance with the DCI. EPA has determined that, as a general policy, it will not suspend the registration of a product when the registrant has in good faith sought and continues to seek to enter into a data development/cost sharing program, but the other registrants developing the data have refused to accept its offer. [If your offer is accepted, you may qualify for Option 2 above by entering into an agreement to supply the data.]

In order to qualify for this method, you must:

1. File with EPA a completed "Certification of Attempt to Enter into an Agreement with other Registrants for Development of Data" (EPA Form 8580-6, enclosed).

2. Provide us with a copy of your offer to the other registrant and proof of the other registrant's receipt of your offer (such as a certified mail receipt). Your offer must, at a minimum, contain the following language or its equivalent:

> [Your company name] offers to share in the burden of producing the data required pursuant to FIFRA sec. 3(c)(2)(B) in the [name of active ingredient] Registration Standard upon terms to be agreed or failing agreement to be bound by binding arbitration as provided by FIFRA section 3(c)(2)(B)(iii).

The remainder of your offer may not in any way attempt to limit this commitment. If the other registrant to whom your offer is made does not accept your offer, and if the other registrant informs us on a DCI Summary Sheet that he will develop and submit the data required under the DCI, then you may qualify for this option. In order for you to avoid suspension under this method, you may not later withdraw or limit your offer to share in the burden of developing the data. In addition, the other registrant must fulfill its commitment to develop and submit the data.

d. You request a waiver of the data requirement. If you believe that a data requirement does not (or should not) apply to your product or its uses, you must provide EPA with a statement of the reasons why you believe this is so. Your statement must address the specific composition or use factors that lead you to believe that a requirement does not apply. Since the Agency has carefully considered the composition and uses of pesticide products in determining that a data requirement applies, EPA does not anticipate that many waivers will be granted. A request for waiver does not automatically extend the timeframes for developing required data, and if your waiver request is denied, your registration may be suspended if you fail to submit the data.

e. You request that EPA amend your registration by deleting the uses for which the data are needed. You are not required to submit data for uses which are no longer on your label.

f. You request voluntary cancellation of the registration of your product(s) for which the data are needed.

5. Procedures for requesting a change in testing protocol.

If you will generate the required data and plan to use test procedures which deviate from (or are not specified in) either EPA's Pesticide Assessment Guidelines or the Reports of Expert Groups to the Chemicals Group, Organization for Economic Cooperation and Development (OECD) Chemicals Testing Programme, you must submit for EPA approval the protocols you propose to use.

You should submit your protocols before beginning testing and await EPA approval, because the Agency will not ordinarily accept as sufficient studies using unapproved protocols. A request for protocol approval will not automatically extend the timeframe for submission of the data, nor will extensions generally be given to conduct studies due to submittal of inappropriate protocols.

6. Procedures for requesting extensions of time.

If you think that you will need more time to generate the data than is allowed by EPA's schedule, you may submit a request for an extension of time. Any request for a time extension which is made as an initial response to a section 3(c)(2)(B) request notice must be submitted in writing to the Product Manager listed at the end of this section and must be made before the deadline for response. Once dates have been committed to and EPA has accepted these commitments, any subsequent requests for a time extension must be submitted in writing to the Office of Compliance Monitoring.

EPA will view failure to request an extension before the response deadline as a waiver of any future claim that there was insufficient time to submit the data. While EPA considers your request, you must strive to meet the deadline for submitting the data.

The extension request should state the reasons why you believe that an extension is necessary and the steps you have taken to meet the testing deadline. Time extensions normally will not be granted due to problems with laboratory capacity or adequacy of funding, since the Agency believes that with proper planning these can be overcome. Time extensions may be considered when joint data development is planned, or when the Agency must approve a new or modified protocol before the study can be begun.

A request for an extension does not automatically extend the timeframe for submission of the data. If EPA denies your request for a time extension and you do not submit the data as requested, EPA may begin proceedings to suspend the registrations of your products.

7. Existing stocks provision upon suspension or cancellation.

EPA will permit continued sale and distribution of existing stocks of a pesticide product which has been suspended or cancelled if doing so would be consistent with the purposes of the Act. However, the Agency has determined that if a registration is suspended for failure to respond to a DCI request under FIFRA sec. 3(c)(2)(B), an existing stocks provision is not consistent with the Act. Accordingly, the Agency does not anticipate granting permission to sell or distribute existing stocks of suspended product except in rare circumstances. If you believe that your product will be suspended or cancelled and that an existing stocks provision should be granted, you have the burden of clearly demonstrating to EPA that granting such permission would be consistent with the Act. The following information must be included in any request for an existing stocks provision:

a. Explanation of why an existing stocks provision is necessary, including a statement of the quantity of existing stocks and your estimate of the time required for their sale or distribution; and

b. Demonstration that such a provision would be consistent with the provisions of FIFRA.

F. REQUIREMENT FOR SUBMISSION OF PRODUCT-SPECIFIC DATA

Under its DCI authority, EPA has determined that certain product-specific data are required to maintain your registrations in effect. Product-specific data are derived from testing using a specific formulated product, and, unlike generic data, generally support only the registration of that product. All such data must be submitted by the dates specified in this Registration Standard.

If you have a manufacturing use product, these data are listed in Table B. If you have an end use product, the data are listed in Table C. As noted earlier, the Agency has decided that it will not routinely require product-specific data for end use products at this time. Therefore, Table C may not be contained in this Registration Standard; if there is no Table C, you are not required to submit the data at this time.

In order to comply with the product specific data requirements, you must follow the same procedures as for generic data. See Section E.4, 5, 6, and 7. You should note, however, that product chemistry data are required for every product, and the only acceptable responses are options E.4.a. (submit data) or E.4.f.(cancellation of registration).

Failure to comply with the product-specific data requirements for your products will result in suspension of the product's registration.

G. REQUIREMENT FOR SUBMISSION OF REVISED LABELING

FIFRA requires each product to be labeled with accurate, complete and sufficient instructions and precautions, reflecting the Agency's assessment of the data supporting the product and its uses. General labeling requirements are set out in 40 CFR 162.10 (see Appendix II - LABELING). In addition, labeling requirements specific to products containing this pesticide are specified in Part II.C of this Registration Standard. Applications submitted in response to this notice must include draft labeling for Agency review.

If you fail to submit revised labeling as required, which complies with 40 CFR 162.10 and the specific instructions in Part II.C, EPA may issue a Notice of Intent to Cancel the registration of your product under FIFRA sec. 6(b)(1).

H. INSTRUCTIONS FOR SUBMISSION

1. Manufacturing Products (MUPs) containing benomyl as sole active ingredient.

a. Within 90 days from receipt of this document, you must submit to the Product Manager in the Registration Division for each product subject to this Registration Standard:

(1) The "FIFRA Section 3(c)(2)(B) Summary Sheet" (EPA Form 8580-1), with appropriate attachments.[5]

(2) Confidential Statement of Formula (EPA Form 8570-4).

(3) Formulator's Exemption Statement (EPA Form).

(4) Product Specific Data Report (EPA Form 8580-4).

(5) Evidence of compliance with data compensation requirements of FIFRA sec. 3(c)(1)(D). Refer to 40 CFR 152.80-152.99.

b. Within 12 months from receipt of this document you must submit to the Product Manager:

(1) Two copies of any required product-specific data (See Table B or C).

(2) Three copies of draft labeling, including the container label and any associated supplemental labeling. Labeling should be either typewritten text on 8-1/2 x 11 inch paper or a mockup of the labeling suitable for storage in 8-1/2 x 11 files. The draft label must indicate the intended colors of the final label, clear indication of the front panel of the label, and the intended type sizes of the text.

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[5] If on the Summary Sheet, you commit to develop the data, present arguments that a data requirement is not applicable or should be waived, or submit protocols or modified protocols for Agency review, you must submit a copy of the Summary Sheet (and any supporting information) to the Office of Compliance Monitoring, which will be monitoring the data generated in response to this notice. This submission is in addition to responding to the Product Manager, and should be submitted to the Office of Compliance Monitoring at the address given at the end of this section. (Actual studies are not to be submitted to the Office of Compliance Monitoring.)

c. Within the times set forth in Table A, you must submit to the Registration Division all generic data, unless you are eligible for the formulator's exemption. If for any reason any test is delayed or aborted so that the agreed schedule cannot be met, immediately notify the Product Manager and the Office of Compliance Monitoring of the problem, the reasons for the problem, and your proposed course of action.

2. Manufacturing Use Products containing benomyl in combination with other active ingredients.

a. Within 90 days from receipt of this document, you must submit to the Product Manager in the Registration Division:

(1) FIFRA sec. 3(c)(2)(B) Summary Sheet, with appropriate attachments[5] (EPA Form 8580-1).

(2) Confidential Statement of Formula (EPA Form 8570-4)

(3) Formulator's Exemption Statement (EPA Form), if applicable.

b. Within the time frames set forth in Table A, you must submit to the Registration Division all generic data, unless you are eligible for the formulator's exemption. If for any reason any test is delayed or aborted so that the agreed schedule cannot be met, immediately notify the Product Manager and the Office of Compliance Monitoring of the problem, the reasons for the problem, and your proposed course of action.

3. End Use Products containing benomyl alone or in combination with other active ingredients.

a. Within 90 days from receipt of this document, you must submit to the Product Manager in the Registration Division:

(1) FIFRA Section 3(c)(2)(B) Summary Sheet, with appropriate attachments[5] (EPA Form 8580-1).

(2) Confidential Statement of Formula (EPA Form 8570-4).

(3) Formulator's Exemption Statement (EPA Form), if applicable.

(4) Product Specific Data Report (EPA Form 8580-4), if Table C lists required product-specific data.

b. Within 12 months from receipt of this document you must submit to the Product Manager:

(1) Two copies of any product-specific data, if required by Table C.

(2) Three copies of draft labeling, including the container label and any associated supplemental labeling. Labeling should be either typewritten text on 8-1/2 x 11 inch paper or a mockup of the labeling suitable for storage in 8-1/2 x 11 files. The draft labeling must indicate the intended colors of the final label, clear indication of the front panel of the label, and the intended type sizes of the text. End use product labeling must comply specifically with the instructions in Part II (Requirements for Registration).

4. Intrastate Products containing benomyl either as sole active ingredient or in combination with other active ingredients.

These products are being called in for full Federal registration. Producers of these products are being sent a letter instructing them how to submit an application for registration.

5. Addresses

The required information must be submitted to the following address:

Henry Jacoby, PM 21
Registration Division (TS-767C)
Office of Pesticide Programs
Environmental Protection Agency
401 M St., SW
Washington, D.C. 20460

The address for submissions to the Office of Compliance Monitoring is:

Laboratory Data Integrity Program
Office of Compliance Monitoring (EN-342)
Environmental Protection Agency
401 M St., SW
Washington, D.C. 20460.

I. DATA APPENDICES

Guide to Tables

Table A

Table B

GUIDE TO TABLES

Tables A, B, and C contain listings of data requirements for the pesticides covered by this Registration Standard.

Table A contains generic data requirements that apply to the pesticide in all products, including data requirements for which a "typical formulation" is the test substance.

Table B contains product-specific data requirements that apply only to a manufacturing use product.

Table C contains product-specific data requirements that apply only to an end use product.

The data tables are generally organized according to the following format:

1. Data Requirement (Column 1). The data requirements are listed in the order in which they appear in 40 CFR Part 158. The reference numbers accompanying each test refer to the test protocols set out in the Pesticide Assessment Guidelines, which are available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

2. Test Substance (Column 2). This column lists the composition of the test substance required to be used for the test, as follows:

TGAI = Technical grade of the active ingredient
PAI = Pure active ingredient
PAIRA = Pure active ingredient, radio labeled
TEP = Typical end use formulation
MP = Manufacturing use product
EP = End use product

Any other test substances, such as metabolites, will be specifically named in Column 2 or in footnotes to the table.

3. Use pattern (Column 3). This column indicates the use patterns to which the data requirement applies. Use patterns are the same as those given in 40 CFR Part 158. The following letter designations are used for the given use patterns:

A = Terrestrial, food
B = Terrestrial, non-food
C = Aquatic, food
D = Aquatic, non-food
E = Greenhouse, food
F = Greenhouse, non-food
G = Forestry
H = Domestic outdoor
I = Indoor

Any other designations will be defined in a footnote to the table.

4. Does EPA have data? (Column 4). This column indicates one of three answers:

YES - EPA has data in its files that completely satisfy this data requirement. These data may be cited by other registrants in accordance with data compensation requirements of Part 152, Subpart E.

PARTIALLY - EPA has some data in its files, but such data do not fully satisfy the data requirement. In some cases, the Agency may possess data on one of two required species, or may possess data on one test substance but not all. The term may also indicate that the data available to EPA are incomplete. In this case, when the data are clarified, or additional details of the testing submitted by the original data submitter, the data may be determined to be acceptable. If this is the case, a footnote to the table will usually say so.

NO - EPA either possesses no data which are sufficient to fulfill the data requirement, or the data which EPA does possess are flawed scientifically in a manner that cannot be remedied by clarification or additional information.

5. Bibliographic citation (Column 5). If the Agency has acceptable data in its files, this column lists the identifying number of each study. This normally is the Master Record Identification (MRID) number, but may be a GS number if no MRID number has been assigned. Refer to the Bibliography Appendices for a complete citation of the study.

6. Must additional data be submitted? (Column 6). This column indicates whether the data must be submitted to the Agency. If column 3 indicates that the Agency already has data, this column will usually indicate NO. If column 3 indicates that the Agency has only partial data or no data, this column will usually indicate YES. In some cases, even though the Agency does not have the data, EPA will not require its submission because of the unique characteristics of the chemical; because data on another chemical can be used to fulfill the data requirement; or because the data requirement has been waived or reserved. Any such unusual situations will be explained in a footnote to the table.

7. Timeframe for submission (Column 7). If column 5 requires that data be submitted, this column indicates when the data are to be submitted, based on the issuance date of the Registration Standard. The timeframes are those established either as a result of a previous Data Call-In letter, or standardized timeframes established by PR Notice 85-5 (August 22, 1985).

3. Footnotes (at the end of each table). Self-explanatory.

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

Guideline Citation and Name of Test	Test Substance1/	Guidelines Status2/	Are Data Required Yes	No	Footnote Number or Citation	Data Must Be Submitted Within Time Frames Listed Below3/
§158.120 Product Chemistry						
Product Identity:						
61-1 - Product Identity and Disclosure of Ingredient	TGAI	R	☐	☒	00067416, 00067421	
61-2 - Description of Beginning Materials and Manufacturing Process	TGAI	R	☒	☐	-	6 months
61-3 - Discussion of Formation of Impurities	TGAI	R	☐	☒	00151522	
Analysis and Certification of Product Ingredients						
62-1 - Preliminary Analysis	TGAI	CR	☐	☒	00151523	
62-2 - Certification of Limits	TGAI	CR	☒	☐		12 months
62-3 - Analytical Method for Enforcement of Limits	TGAI	CR	☒	☐	00151523 6/ (Partially)	12 months
Physical and Chemical Characteristics						
63-2 - Color	TGAI	R	☐	☒	00067421, 00151521	
63-3 - Physical State	TGAI	R	☐	☒	00151521	
63-4 - Odor	TGAI	R	☐	☒	00151521	
63-5 - Melting Point	TGAI	R	☐	☒	00151521	
63-6 - Boiling Point	TGAI	R	☐	☒	4/	

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

Guideline Citation and Name of Test	Test Substance1/	Guidelines Status2/	Are Data Required Yes	Are Data Required No	Footnote Number or Citation	Data Must Be Submitted Within Time Frames Listed Below3/
§158.120 Product Chemistry (Continued)						
Physical and Chemical Characteristics (Continued)						
63-7 - Density, Bulk Density, or Specific Gravity	TGAI	R	☐	☒	00151521	
63-8 - Solubility	TGAI or PAI	R	☐	☒	00151521	
63-9 - Vapor Pressure	PAI	R	☒	☐	-	6 months
63-10 - Dissociation constant	PAI	R	☐	☒	00151521	
63-11 - Octanol/water partition coefficient	PAI	R	☐	☒	00151521	
63-12 - pH	TGAI	R	☒	☐		6 months
63-13 - Stability	TGAI	R	☐	☒		
Other Requirements:						
64-1 - Submittal of samples	TGAI, PAI	CR	☐	☒	5	

1/ TGAI = Technical Grade of the Active Ingredient; PAI = Pure Active Ingredient.
2/ R = Required; CR = Conditionally Required.
3/ Data must be submitted within the indicated time frame, based on the date of the Guidance Document.
6 Month Due Date is October 30, 1986.
12 Month Due Date is April 30, 1987.
4/ This is not required for benomyl since it is a solid.
5/ This compound does not require the submittal of samples at this time.
6/ Information is required on the detector utilized in the gas chromatographic procedure for determining 1,3-dibutylurea in technical benomyl.

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

Data Requirements	Composition 1/	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B)? Time Frames For Data Submission 2/
§158.125 Residue Chemistry				
171-2 - Chemical Identity	TGAI	Yes	00067416, 00067421	No
171-4 - Nature of Residue (Metabolism)				
- Plants	PAIRA	Partially	00037185, 00037186 00037187, 00037188 00037189, 00037196 00037360, 00037361 00037362, 00037363 00037364, 00038451 00052322, 00097321 00097340, 00097355 00097605, 00097611 00097613, 00097626 00097628,	Yes 3/ 18 months
- Livestock	PAIRA and Plant Metabolites	Partially	00035361, 00044601 00097584, 00097594 00100751,	Yes 4/ 18 months
171-4 - Residue Analytical Method				
- Plant and Animal Residues	TGAI and Metabolites	Partially	00026042, 00035360 00046245, 00046819 00048098, 00048099 00097294, 00097308 00097338, 00097342 00097343, 00097344	Yes 5/ 15 months

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

Data Requirements	Composition 1/	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B)? Time Frames For Data Submission 2/
171-4 - Residue Analytical Method (cont.)				
- Plant and Animal Residues	TGAI and Metabolites	Partially	00097354, 00097580 00097592, 00106600	Yes 5/ 15 months
171-4 - Storage Stability Data	PAI	Partially	00026042, 00044906 00046245,	Yes 6/ 18 months
171-4 - Magnitude of the Residue-Residue Studies				
- Crop Group: Root & Tuber Vegetables				
- Carrots	TEP	Partially	00035346, 00097259 00097590	Yes 7/8/18 months
- Rutabagas	TEP	Partially	00106030, 00097592 (See turnip data)	Yes 7/ 18 months
- Sugar beet roots	TEP	Yes	00035346, 00097259 00097303	No 7/
- Sweet potatoes	TEP	Yes	00097580	No 7/
- Turnip roots	TEP	Partially	00106030, 00097592	Yes 7/ 18 months

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

ata Requirements	Composition 1/	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B)? Time Frames For Data Submission 2/
158.125 Residue Chemistry - Continued				
171-4 - Magnitude of the Residue-Residue Studies				
- Crop Group: Leaves of Root & Tuber Vegetables				
- Sugar Beet Tops	TEP	Yes	00035346, 00097342	No 7/
- Turnip Tops	TEP	Partially	00106030	Yes 7/ 18 months
- Crop Group: Bulb Vegetable				
- Garlic	TEP	Yes	GS0119-029	No 7/
- Crop Group: Leafy Vegetables				
- Celery	TEP	Partially	00097293	Yes 7/9/ 18 months
- Dandelions	TEP	Partially	00128338	Yes 7/10/18 months
- Spinach	TEP	No	-	Yes 7/11/18 months
- Crop Group: Brassica Leafy Vegetables				
- Broccoli	TEP	Partially	00106030	Yes 7/12/18 months
- Brussels Sprouts	TEP	Yes	00106030, 00129169	No 7/
- Cabbage	TEP	No	-	Yes 7/13/18 months
- Cauliflower	TEP	No	-	Yes 7/14/18 months
- Chinese Cabbage	TEP	Yes	00129168	No 7/

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

Data Requirements	Composition 1/	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B)? Time Frame for Data Submission 2/
§158.125 Residue Chemistry - Continued				
- Crop Group: Brassica Leafy Vegetables				
- Collards	TEP	Partially	00106030,	Yes 7/15/ 18 months
- Kale	TEP	Partially	00106030,	Yes 7/15/ 18 months
- Kohlrabi	TEP	Partially	00106030,	Yes 7/16/ 18 months
- Mustard Greens	TEP	Partially	00106030,	Yes 7/17/ 18 months
- Crop Group: Legume Vegetables				
- Beans	TEP	Yes	00035346, 00052321 00052324	No 7/
- Soybeans	TEP	Partially	00097349,	Yes 7/18/ 18 months
- Crop Group: Foliage of Legume Vegetables				
- Bean Vine Forage	TEP	Partially	00035346, 00052321 00052323, 00052324	Yes 7/19/ 18 months
- Crop Group: Fruiting Vegetables				
- Eggplant	TEP	Yes	00046244,	No 7/
- Peppers	TEP	Partially	00046244,	Yes 7/20/ 18 months
- Tomatoes	TEP	Partially	00097347, 00097621	Yes 7/21/ 18 months

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

Data Requirements	Composition 1/	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B)? Time Frames for Data Submission 2/
§158.125 Residue Chemistry - Continued				
- Crop Group: Cucurbit Vegetables				
- Cucumbers	TEP	Yes	00030771, 00081915	No 7/
- Melons	TEP	Yes	00003806, 00030771 00081915, 00097337	No 7/
- Pumpkins	TEP	Yes	00003806, 00030771 00081915, 00097337	No 7/22/
- Summer Squash	TEP	Yes	00081915, 00097303	No 7/
- Winter Squash	TEP	Yes	00003806, 00030771 00081915, 00097337	No 7/22/
- Crop Group: Citrus Fruits				
- Citrus Fruit	TEP	Partially	00040272, 00097344	Yes 7/23/18 months
- Crop Group: Pome Fruits				
- Apples	TEP	Yes	00037365, 00063822 00077070, 00097335 00098695	No 7/
- Pears	TEP	Yes	00037365	No 7/
- Crop Group: Stone Fruits				
- Apricots	TEP	Yes	00077070, 00097303 00097316	No 7/
- Cherries	TEP	Yes	00037182, 00077070 00097303	No 7/

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

Data Requirements	Composition 1/	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or PArtially)	Bibliographic Citation	Must Additional Data Be Sumitted Under FIFIRA § 3(c)(2)(B)? Time Frame for Data Submission 2/
§158.125 Residue Chemistry - Contnued				
- Crop Group: Stone Fruits				
- Nectarines	TEP	Yes	00077070, 00097303	No 7/
- Peaches	TEP	Yes	00077070, 00097303 00097316	No 7/
- Plums (Fresh prunes)	TEP	Partially	00037182, 00097303	Yes 7/24/ 18 months
- Crop Group: Small Fruits & Berries				
- Blackberries	TEP	Yes	00097315	No 7/
- Blueberries	TEP	Yes	00106600	No 7/
- Boysenberries	TEP	Yes	00097315	No 7/
- Currants	TEP	Yes	00106600	No 7/25/
- Dewberries	TEP	Yes	00097315, 00106600	No 7/26/
- Grapes	TEP	Partially	00054213, 00054216 00077070, 0097310	Yes 7/27/ 18 months
- Loganberries	TEP	Yes	00097315, 00106600	No 7/26/
- Raspberries	TEP	Yes	00097315	No 7/
- Strawberries	TEP	Partially	00097269, 00097299	Yes 7/28/ 18 months
- Crop Group: Tree Nuts				
- Nuts (Almonds, Macadamia Nut, Pecans	TEP	Yes	00097267, 00097306 00108623	No 7/

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

Data Requirements	Composition 1/	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliography Citation	Must Additional Data Be Submitted Under FIFIRA § 3(c)(2)(B)? Time Frames For Data Submission 2/
§158.125 Residue Chemistry - Continued				
- Crop Group: Cereal Grains				
- Corn, Fresh (sweet kernals + cobs w/husks removed)	TEP	Partially	GS0119-032	Yes 7/29/ 18 months
- Rice	TEP	Partially	001306840	Yes 7/30/ 18 months
- Barley grain	TEP	Partially	00097578, 00148204	Yes 7/31/ 18 months
- Oat grain	TEP	Partially	00078626, 00097331 00097578	Yes 7/31/ 18 months
- Rye grain	TEP	Partially	00078626, 00097331 00097578	Yes 7/31/ 18 months
- Wheat grain	TEP	Partially	00078626, 00097331 00097578	Yes 7/31/ 18 months
- Crop Group: Cereal Grains (Forage, Fodder & Straw)				
- Corn, sweet (fodder & forage)	TEP	Partially	GS0119-032	Yes 7/32/ 18 months
- Rice straw	TEP	Partially	00130684	Yes 7/33/ 18 months
- Barley hay & straw	TEP	Partially	00078626, 00097578	Yes 7/31/ 18 months
- Oat hay & straw	TEP	Partially	00078626, 00097331 00097578	Yes 7/31/ 18 months
- Rye hay & straw	TEP	Partially	00078626, 00097331 00097578	Yes 7/31/ 18 months
- Wheat hay & straw	TEP	Partially	00078626, 00097331 00097578	Yes 7/31/ 18 months

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

Data Requirement	Composition 1/	Does EPA Have Data To Satisfy This Requirement? (Yes, No or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B)? Time Frames for Data Submission 2/
§158.125 Residue Chemistry - Continued				
171-4 - Magnitude of the Residue-Residue Studies				
- Crop Group (Miscellaneous Commodities)				
- Avocados	TEP	Partially	00097313,	Yes 7/34/ 18 months
- Bananas	TEP	Yes	00066784, 00097301	No 7/
- Mangoes	TEP	Yes	00097311	No 7/
- Mushrooms	TEP	Yes	00097308	No 7/
- Papayas	TEP	Partially	(IR-4/PP#6E1842) 1976	Yes 7/35/ 18 months
- Pineapples	TEP	Partially	00035614	Yes 7/36/ 18 months
- Peanuts	TEP	Yes	00035346, 00097167	No 7/
171-4 - Magnitude of the Residue-Residue Studies				
Cattle, Goats, Hogs, Horses, & Sheep (Fat, meat, & meat by-products)	TGAI or Plant Metabolites	Partially	00035358, 00035359 00104728	Yes 37/ 18 months
Milk	TGAI or Plant Metabolites	Partially	00035358, 00035359 00104728	Yes 38/ 18 months
Poultry & Eggs	TGAI or Plant Metabolites	Partially	00054214, 00097354	Yes 39/ 18 months

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

§158.125 Residue Chemistry - Continued

1/ Composition: TGAI = Technical grade of the active ingredient; PAIRA = Pure active ingredient, radiolabelled; TEP = Typical end-use product; EP = End-use product.

2/ Data must be submitted within the indicated time frame, based on the date of the Guidance Document.
- ° 15 Month Due Date is April 30, 1987.
- ° 18 Month Due Date is July 30, 1987.

3/ Data depicting the distribution and metabolism of [^{14}C]Benomyl are required for the following: a) mature soybeans harvested 35 days after the last of two foliar applications at 0.5 lb ai/A (applied 14 days apart),
   b) mature rice (grain and straw) harvested 21 days after the last of two foliar applications at 1.0 lb ai/A
   c) peaches(fruit) harvested immediately after the last of two foliar applications (<3 weeks apart) at 1.0 lb ai/A;
   d) sugar beets harvested 21 days after the last of five foliar applications at .25 lb ai/A.

If the metabolism data differ significantly between these four, then metabolism data must be submitted for a representative crop in each crop group for which registered uses of benomyl exist.

Analyses should include hydrolysis and reextraction of plant residues to determine the nature of bound or conjugated residues of benomyl.

4/ Data depicting the distribution and metabolism of [^{14}C]Benomyl are required for the following:
   a) Metabolism data utilizing ruminants where animals must be dosed for 3 days with [^{14}C]benomyl at 174 ppm in the total diet. The animals must be sacrificed within 24 hours of the final dose. The distribution and characterization of residues (free and conjugated) must be determined in the kidney, muscle and fat,
   b) Metabolism data utilizing poultry where hens must be dosed for 3 days with [^{14}C]benomyl at 26.0 ppm in the total diet. The birds must be sacrificed within 24 hours of the final dose (eggs must be collected twice daily). The distribution and characterization of residues (free and conjugated) must be determined in the eggs, muscle, fat, kidney and liver.

5/ A validated data collection and enforcement method is required for detection and quantification of all residues of concern (bound and free) in ruminant liver. This will require feeding of [^{14}C]benomyl, [^{14}C]MBC, and [^{14}C]2-AB (and any additional major plant metabolites of toxicological concern) to living animals rather than standard fortification and recovery tests.

6/ The following storage stability data are required:
   a) Storage intervals must be provided for samples used to generate supporting tolerances for residues in or on the commodities and their processed products listed under CFR 40 § 180.294,
   b) Frozen storage stability of benomyl, MBC, and 2-AB in two plant commodities fortified at levels of each ranging from 0.1 to 125.0 ppm at intervals up to 9 months or longer if the storage intervals for the commodities listed in the data gaps above exceed 9 months.

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

§158.125 Residue Chemistry - Continued

7/ Note: When the required data under sections, "Nature of Residues in Plants", "Residue Analytical Methods", and "Storage Stability" are reviewed, data for this crop may result in additional data requirements.

8/ Additional carrot residue data are required: data reflecting multiple ground and aerial foliar applications (applied at 7-day intervals) of the 50% WP formulation at 0.5 lb ai/A application from tests conducted in California (48.5%), Texas (13%), and Wisconsin (9%). Samples must be collected 4 days after the final application.

9/ Certain data reflecting residues of benomyl and MBC in or on celery (untrimmed) 7 days after the last of 28 ground and aerial applications (made at 7-day intervals) of the 50% WP or 75% FlC formulation at 0.25 lb ai/A are required. Tests should be conducted in California (CA), Florida (FL), and Michigan (MI), states which represent the major U.S. celery production areas. Samples must be collected 4 days after the final application. Additonal celery residue data are required: data reflecting 28 aerial applications (made at 7-day intervals) of the 10% SC/L and either the 50% WP, 3% FlC, or 75% FlC formulation from tests conducted in CA.

10/ Data reflecting residues of benomyl and MBC in or on dandelion greens per the proposed use of the 50% WP formulation at 0.25 lb ai/A applied 4 times at 7-day intervals are required. Additional data showing the recovery of benomyl and MBC following storage of fortified samples at intervals approximating the celery data are required.

11/ Data reflecting residues of benomyl and MBC in or on spinach per seed treatment at 1.00 lb ai/100 lb of seed using the 50% WP formulation in a slurry from tests conducted in CA, CO, MD, NJ, TX, or VA.

12/ Certain data reflecting residues of benomyl and MBC in or on mature broccoli immediately after the last of three foliar treatments (applied at 14-day intervals) with the 50% WP at 1.00 lb ai/A are required. Both ground and aerial applications must be represented. Tests should be conducted in Arizona (AZ) and Washington (WA).

13/ Certain data reflecting residues of benomyl and MBC in or on mature cabbage harvested immediately after the last of three foliar treatments (applied at 14-day intervals) with the 50% WP at 1.00 lb ai/A are required. Both ground and aerial applications must be represented. Tests should be conducted in AZ and WA.

14/ The Agency will extrapolate residue data required in or on mature broccoli for residue data on cauliflower.

15/ The Agency will extrapolate residue data required in or on mustard greens for residue data on collards and kale.

16/ The Agency will extrapolate residue data required in or on broccoli and cauliflower for residue data on kohlrabi.

17/ Data from mustard greens harvested at normal maturity which were seed-treated at 4 oz ai/100 lb seed are required. The tests should be conducted in WA, which can also represent OR. Additional data are required showing residues in or on mature mustard greens harvested immediately after the last of three foliar treatments (applied at 14-day intervals) with the 50% WP at 1.00 lb ai/A. Both ground and aerial applications must be represented. Tests must be conducted in WA.

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

§158.125 Residue Chemistry - Continued

18/ A processing study is required depicting a) combined residues for benomyl and MBC in or on soybean hulls; and b) residues of benomyl (including its conversion products STB and BUB) in refined oil and soapstock.

19/ Certain residue data are required: data reflecting residues in or on bean vine hay harvested 14 days after the last of two foliar applications (made with aerial and ground equipment) with either the 50% WP or 75% FlC formulation at 1.00 lb ai/A. The first application should be made at 25-50% bloom and the second at peak bloom. Tests should be conducted in MI, NY, OR and WI, where these states represent the major U.S. growing areas for beans. A tolerance must be proposed; alternatively, a bean vine hay feeding restriction may be imposed.

20/ Certain residue data are required: data reflecting residues in or on bell peppers harvested immediately after the last of >8 foliar applications of the 50% WP and 10% SC/L formulations at 0.5 lb ai/A. Both ground and aerial applications must be represented. Tests must be conducted in CA.

21/ An additional processsing study utilizing standard industrial procedures is required using tomatoes containing measurable weathered residues of benomyl and reflecting analysis of concentrated tomato products and wet and dry pomace.

22/ The Agency will extrapolate certain residue data utilized for melons to pumpkins and winter squash.

23/ Certain residue data are required: a) Data pertaining to oil processed from field-treated oranges bearing detectable weathered residues, b) data showing residues in dried pulp processed from whole oranges bearing measurable weathered residues, and c) data showing residues in or on whole oranges bearing measurable weathered residues and in or on peel processed from these oranges (alternatively, submit calculation of residues in whole orange fruit in MRID 00040272.

24/ Data are required depicting combined residues for benomyl and MBC in or on prunes (dried) processed from fresh prunes bearing measurable weathered residues.

25/ The Agency will extrapolate certain residue data utilized for blueberries to currants.

26/ The Agency will extrapolate certain residue data utilized for blackberries, boysenberries, and raspberries to dewberries and to loganberries.

27/ Residue data are required from raisin waste, processed from grapes bearing measurable, weathered residues.

28/ Residue data are required from mature strawberries harvested on the day of the last of five aerial and ground applications (separate tests) with the 1.5% D(dust) formulation, at 0.6 lb ai/A. The applications should be made at 7-day intervals. The tests must be done in CA or OR where D formulations are registered.

29/ Residue data are required reflecting residues in or on fresh sweet corn harvested immediately after the last of ≥5 foliar applications of the 50% WP and 10% SC/L formulations at 0.5 lb ai/A. Both ground and aerial application data must be represented. Tests must be conducted in CA.

30/ Data are required depicting combined residues for benomyl and MBC in or on rice hulls, polished rice, and milled products processed from rough rice containing measurable weathered residues.

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

§158.125 Residue Chemistry - Continued

31/ Residue data are required per Agency memoranda of 10/10/84 in file (PP#6F1748: Tolerances on Cereal Grains Group):
  a. Validated analytical method determining the total toxic residues including bound metabolites of benomyl in liver,
  b. Establishing tolerances of 4 ppm in liver of cattle, goats, hogs, horses, and sheep, and
  c. Establishing tolerance of 1 ppm in milk.

32/ Residue data are required reflecting residues in or on sweet corn forage and fodder harvested immediately after the last of ≥5 foliar applications of the 50% WP and 10% SC/L formulations at 0.5 lb ai/A. Both ground and aerial application data must be represented. Tests must be conducted in CA.

33/ Data are required depicting combined residues for benomyl and MBC in or on rice straw as the result of two foliar applications (the first made at booting; second at heading) using the 50% WP and 10% SC/L formulations at 1.0 lb ai/A. Both ground and aerial application data must be represented using a 21-day pre harvest interval (PHI). Tests must be conducted in AR, LA, MS, or TX.

34/ Residue data are required reflecting residues in or on avocados harvested 14 days following the last of 15 application of the 75% FlC formulations at 1.25 lb ai/A. Both ground and aerial application data must be represented. Tests must be conducted in FL.

35/ Residue data are required reflecting combined residues of benomyl and MBC in or on papayas harvested 14 days after the last of 7 applications (applied at three week intervals) of the 50% WP formulations at 0.5 lb ai/A. Both ground and aerial application data must be represented. Tests must be conducted in Hawaii.

36/ Certain residue data are required on pineapples:
  a. Data reflecting combined residues of benomyl and MBC in bran prepared from pineapples bearing measurable weathered residues.
  b. Data reflecting combined residues of benomyl and MBC in or on forage grown from seed pieces dipped in 0.625 lb ai/100 gallons benomyl prepared with the 50% WP or 75% FlC formulations. A tolerance must be proposed or alternatively, a feeding and grazing restriction may be proposed.

37/ The established tolerances for the combined residues of benomyl and MBC (calculated as benomyl) in the fat, meat, meat by-products of cattle, goats, hogs, horses, and sheep may be revised when the required metabolism studies for plants and animals are submitted and reviewed.

38/ The established tolerances for the combined residues of benomyl and MBC (calculated as benomyl) in milk may be revised when the required metabolism studies for plants and animals are submitted and reviewed.

39/ The established tolerances for the combined residues of benomyl and MBC (calculated as benomyl) in the fat, liver, meat, meat by-products and eggs of poultry may be revised when the required metabolism studies for poultry are submitted and reviewed.

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

Data Requirement	Composition 1/	Use 2/ Pattern	Does EPA Have Data To Satisfy This Requirement? (Yes, No or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B)? Time Frame for Data Submission 3/
§158.130 Environmental Fate					
DEGRADATION STUDIES-LAB:					
161-1 - Hydrolysis	TGAI or PAIRA	A,B,C,E,F,H	Yes	Acc. 259471	No
Photodegradation					
161-2 - In water	TGAI or PAIRA	A,B,C	Yes	Acc. 259471	No
161-3 - On soil	TGAI or PAIRA	A	Yes	Acc. 259471	No
161-4 - In Air	TGAI or PAIRA	E,F	No		No 9/
METABOLISM STUDIES-LAB:					
162-1 - Aerobic Soil	TGAI or PAIRA	A,B,E,F,H	No	-	Yes 27 months
162-2 - Anaerobic Soil	TGAI or PAIRA	A	No	-	Yes 4/5/ 27 months
162-3 - Anaerobic Aquatic	TGAI or PAIRA	C	No	-	Yes 27 months
162-4 - Aerobic Aquatic	TGAI or PAIRA	C	No	-	Yes 27 months
MOBILITY STUDIES:					
163-1 - Leaching and Adsorption/Desorption	TGAI or PAIRA	A,B,C,E,F,H	Partially	Acc. 259471	Yes 10/ 12 months
163-2 - Volatility (Lab)	TEP	A,E,F	No	-	Yes 12 months
163-3 - Volatility (Field)	TEP	A,E,F	No	-	Yes 15 months

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

Data Requirement	Composition 1/	Use 2/ Pattern	Does EPA Have Data To Satisfy This Requirement? (Yes, No or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B)? Time Frame for Data Submission 3/
§158.130 Environmental Fate - Continued					
DISSIPATION STUDIES-FIELD:					
164-1 - Soil	TEP	A,B,H	No	-	Yes 27 months
164-2 - Aquatic (Sediment)	TEP	C	No	-	Yes 27 months
164-3 - Forestry	TEP	G	No		No 9/
164-4 - Combination and Tank Mixes	TEP	-	No		No 6/
164-5 - Soil, Long-term	TEP	A	No		Yes 50 months
ACCUMULATION STUDIES:					
165-1 - Rotational Crops (Confined)	PAIRA	A,C	No	-	Yes 7/ 39 months
165-2 - Rotational Crops (Field)	TEP	A,C	No	-	Yes 7/ 50 months
165-3 - Irrigated Crops	TEP	C	No	-	Yes 8/ 39 months
165-4 - In Fish	TGAI or PAIRA	A,B,C	No		Yes 11/
165-5 - In Aquatic Non-Target Organisms	TEP	A,B,C	No		No 9/

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

§158.130 Environmental Fate - Continued

1/ Composition: TGAI = Technical grade of the active ingredient; PAIRA = Pure active ingredient, radiolabelled: TEP = Typical end-use product.

2/ The use patterns are coded as follows: A=Terrestrial, Food Crop; B=Terrestrial, Non-Food; C=Aquatic, Food Crop; D=Aquatic, Non-Food; E=Greenhouse, Food Crop; F=Greenhouse, Non-Food; G=Forestry; H=Domestic Outdoor; I=Indoor.

3/ Data must be submitted within the indicated time frame, based on the date of the Guidance Document.

- 12 Month Due Date is April 30, 1987.
- 15 Month Due Date is July 30, 1987.
- 27 Month Due Date is July 30, 1988.
- 39 Month Due Date is July 30, 1989.
- 50 Month Due Date is June 30, 1990.

4/ Data are only required for field-vegetable crop uses.

5/ Anaerobic aquatic metabolism data may be substituted for anaerobic soil metabolism data.

6/ Data requirements on Benomyl in combination and tank mixes are not addressed in this Guidance Document.

7/ For crops rotated on treated areas, one of the following requirements will apply.
   a. A tolerance must be obtained for the rotated crop.
   b. Data must be submitted to determine a rotational interval at which unregistered crops planted on treated areas will be free of illegal residues.

8/ For benomyl use on rice, one of the following requirements will apply.
   a. A tolerance must be obtained for any crop used for food or feed which is exposed to irrigation water containing benomyl residues.
   b. Data must be submitted to show conditions under which rice irrigation water can be used on other crops without resulting in illegal plant residues.

9/ Data are not required in accordance with the current use patterns.

10/ Data are required on the adsorption and desorption of benomyl in an aquatic sediment.

11/ Data on the primary degradate are currently being reviewed by the Agency and they may be acceptable in support of the Benomyl Registration Standard.

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

Data Requirement	Composition 1/	Use 2/ Pattern	Does EPA Have Data To Satisfy This Requirement? (Yes, No or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B)? Time Frame for Data Submission 3/
§158.140 Reentry Protection					
132-1 - Foliar Dissipation	TEP	A,B,C	No		No 4/
133-1 - Soil Dissipation	TEP	A,B,C	No		No 4/
133-3 - Dermal Exposure	TEP	A,B,C	No		No 4/
133-4 - Inhalation Exposure	TEP	A,B,C	No		No 4/
§158.142 Spray Drift					
201-1 - Droplet Size Spectrum	TEP	A,B,C	No		No 4/
201-1 - Drift Field Evaluation	TEP	A,B,C	No		No 4/

1/ Composition: TEP = Typical end-use product.
2/ The use patterns are coded as follows: A=Terrestrial, Food Crop; B=Terrestrial, Non-Food; C=Aquatic, Food Crop; D=Aquatic, Non-Food; E=Greenhouse, Food Crop; F=Greenhouse, Non-Food; G=Forestry; H=Domestic Outdoor; I=Indoor.
3/ Data not required based on the current Agency Guidelines.
4/ These data requirements are not applicable to Benomyl's use patterns.

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

Data Requirement	Composition 1/	Use 2/ Pattern	Does EPA Have Data To Satisfy This Requirement? (Yes, No or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B)? Time Frame for Data Submission 3/
§158.135 Toxicology					
ACUTE TESTING:					
81-1 - Acute Oral Toxicity - Rat	TGAI	A,B,E,F,G,H	Yes	00097277	No
81-2 - Acute Dermal Toxicity - Rabbit	TGAI	A,B,E,F,G,H	Yes	00064822	No
81-3 - Acute Inhalation Toxicity - Rat	TGAI	A,B,E,F,G,H	Yes	00097599, 00097281	No
81-4 - Primary Eye Irritation	TGAI	A,B,E,F,G,H	Yes	00064820, 00084579	No
81-5 - Primary Skin Irritation	TGAI	A,B,E,F,G,H	Yes	00064821	No
81-6 - Dermal Sensitization	TGAI	A,B,E,F,G,H	Yes	00097289	No
81-7 - Delayed Neurotoxicity - Hen	TGAI	A,B,E,F,G,H	Yes	GS0119-007	No
SUBCHRONIC TESTING:					
82-1 - 90-Day Feeding:	TGAI	A,B,E,F,G,H	Yes		
- Rodent (Rat),				00066771	No
- Non-rodent (Dog)				00066785	No
82-2 - 21-Day Dermal - Rat	TGAI	A,B,E,F,G,H	Yes	00097287	No
82-3 - 90-Day Dermal - Rabbit	TGAI	A,B,E,F,G,H	No		No 4/
82-4 - 90-Day Inhalation: - Rat	TGAI	A,B,E,F,G,H	No	-	Yes 15 months

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

Data Requirement	Composition 1/	Use 2/ Pattern	Does EPA Have Data To Satisfy This Requirement? (Yes, No or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B)? Time Frame for Data Submission 3/
§158.135 Toxicology - Continued					
SUBCHRONIC TESTING:					
82-5 - 90-Day Neurotoxicity: - Hen -Mammal	TGAI	A,B,E,F,G,H	No		No 4/
CHRONIC TESTING:					
83-1 - Chronic Toxicity - 2 species:					
- Rodent, and	TGAI	A,B,E,F,G,H	Yes	00097284	No
- Non-rodent (Dog)	TGAI	A,B,E,F,G,H	Yes	00061618, 00081913 00097305, 00097318 00097326	No
83-2 - Oncogenicity -					
2 species:					
- Rat (preferred), and	TGAI	A,B,E,F,G,H	Yes	00097284	No
- Mouse (preferred)	TGAI	A,B,E,F,G,H	Yes	00096514	No
83-3 - Teratogenicity - 2 species:					
- Rat	TGAI	A,B,E,F,G,H	Yes	00115674, 00126522 GS0119-009,	No
- Mouse	TGAI	A,B,E,F,G,H	Yes	GS0119-017	No
83-4 - Reproduction - Rat 2-generation	TGAI	A,B,E,F,G,H	Yes	00066773	No

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

Data Requirement	Composition 1/	Use 2/ Pattern	Does EPA Have Data To Satisfy This Requirement? (Yes, No or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B)? Time Frame for Data Submission 3/
§158.135 Toxicology - Continued					
MUTAGENICITY TESTING					
84-2 - Gene Mutation	TGAI	A,B,E,F,G,H	Yes	00038808, GS0119-001, GS0119-002	No
84-2 - Structural Chromosomal Aberration	TGAI	A,B,E,F,G,H	Yes	GS0119-003, GS0119-004	No
84-4 - Other Genotoxic Effects	TGAI	A,B,E,F,G,H	Yes	GS0119-005, GS0119-006	No
SPECIAL TESTING					
85-1 - General Metabolism	PAI or PAIRA	A,B,E,F,G,H	No	-	Yes 24 months
85-2 - Dermal Penetration	Choice	A,B,E,F,G,H	Yes	GS0119-014	No
86-1 - Domestic Animal Safety	Choice	A,B,E,F,G,H	No		No 4/

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

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§158.135 Toxicology - Continued

1/ Composition: PAI = Pure active ingredient; PAIRA = Pure active ingredient, radiolabelled; Choice = Choice of several test substances determined on a case-by-case basis.

2/ The use patterns are coded as follows: A=Terrestrial, Food Crop; B=Terrestrial, Non-Food; C=Aqautic, Food Crop; D=Aquatic, Non-Food; E=Greenhouse, Food Crop; F=Greenhouse, Non-Food; G=Forestry: H=Domestic Outdoor; I=Indoor.

3/ Data must be submitted within the indicated time frame, based on the date of the Guidance Document....
- ° 15 Month Due Date is July 30, 1987.
- ° 24 Month Due Date is April 30, 1988 .

4/ The guidelines and use patterns indicate that these data are not required.

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

Data Requirement	Composition 1/	Use 2/ Pattern	Does EPA Have Data To Satisfy This Requirement? (Yes, No or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B)? Time Frame for Data Submission 3/
§158.145 Wildlife and Aquatic Organisms					
AVIAN AND MAMMALIAN TESTING					
71-1 - Acute Avian Oral Toxicity	TGAI	A,B,C	No	-	Yes 9 months
	MBC 9/	A,B,C	No	-	Yes 9 months
71-2 - Avian Subacute Dietary Toxicity					
- Upland Game Bird, and	TGAI	A,B,C	Partially	00066783	Yes 5/ 9 months
- Waterfowl	TGAI	A,B,C	Partially	00066783	Reserved 5/
	MBC 9/	A,B,C	No	-	Yes 9 months
71-3 - Wild Mammal Toxicity	TGAI	A,B,C	No		No 11/
71-4 - Avian Reproduction					
- Upland Game Bird, and	TGAI	A,B,C	No		Reserved 6/
- Waterfowl	TGAI	A,B,C	No		Reserved 6/
	MBC 9/	A,B,C	No	-	Reserved 6/
71-5 - Simulated Field Testing					
- Mammals, and	TEP	A,B,C	No		No 11/
- Birds	TEP	A,B,C	No		No 11/
- Actual Field Testing					
- Mammals, and	TEP	A,B,C	No		No 11/
- Birds	TEP	A,B,C	No		No 11/

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

Data Requirement	Composition 1/	Use Pattern 2/	Does EPA Have Data To Satisfy This Requirement? (Yes, No or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B)? Time Frame for Data Submission 3/	
§158.145 Wildlife and Aquatic Organisms - Continued						
AQUATIC ORGANISM TESTING						
70-1 - Special Test (Residue Monitoring)	TEP	C	Partially	GS0119-033	Yes 10/	24 months
72-1 - Freshwater Fish Toxicity - Warmwater Fish Species,	TGAI	A,B,C	Yes	GS0119-019, GS0119-020 GS0119-024	No	
	TEP 7/	A,B,C	No	-	Yes	9 months
	a) WP 12/	C	Yes	GS0119-019, 00066782 GS0119-020, GS0119-022 GS0119-024, GS0119-025	No	
	b) FC 13/	C	No	-	Yes	9 months
	MBC 9/	A,B,C	Yes	GS0119-019	No	
- Coldwater Fish Species	TGAI	A,B,C	Yes	GS0119-019, GS0119-020	No	
	TEP 8/					
	a) WP 12/	C	Yes	00070426, 00097615 GS0119-019, GS0119-020 GS0119-021, GS0119-023	No	
	b) FC 13/	C	No		No 11/	
	MBC 9/	A,B,C	Yes	GS0119-019	No	
72-2 - Acute Toxicity to Freshwater Invertebrates	TGAI	A,B,C	Yes	GS0119-026	No	

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

Data Requirement	Composition 1/	Use 2/ Pattern	Does EPA Have Data To Satisfy This Requirement? (Yes, No or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B)? Time Frame for Data Submission 3/
§158.145 Wildlife and Aquatic Organisms - Continued					
	TEP 7/	C	No	-	Yes 9 months
	a) WP 12/	C	No	-	Yes 9 months
	b) FC 13/	C	No	-	Yes 9 months
	MBC 9/	A,B,C	No	-	Yes 9 months
72-3 - Acute Toxicity to Estuarine and Marine Organisms					
- Marine Fish	TGAI	A,B,C	No	-	Yes 12 months
- Mollusk	TGAI	A,B,C	No	-	Yes 12 months
- Shrimp	TGAI	A,B,C	No	-	Yes 12 months
	TEP 15/	C	No	-	Yes 12 months
	a) WP 12/	C	Partially	00078579	Yes 16/ 12 months
	b) FC 13/	C	No	-	Yes 12 months
	MBC 9/	C	No	-	Yes 15/ 12 months
72-4 - Fish Early Life Stage, and	TGAI	C	No	-	Yes 4/ 15 months
- Aquatic Invertebrate Life-Cycle	TGAI	C	No	-	Yes 15 months
72-5 - Fish - Life-Cycle	TGAI	C	No		Reserved 8/

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

Data Requirement	Composition 1/	Use Pattern 2/	Does EPA Have Data To Satisfy This Requirement? (Yes, No or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B)? Time Frame for Data Submission 3/
§158.145 Wildlife and Aquatic Organisms - Continued					
72-6 - Aquatic Organism Accumulation	TGAI, PAI OR Degradation Product				
- Crustacean			No		No 14/
- Fish			No		No 14/
- Insect Nymph			No		No 14/
- Mollusk			No		No 14/
72-7 - Actual Field Testing -Aquatic Organisms	TEP	C	No		Reserved 17/

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

§158.145 Wildlife and Aquatic Organisms - Continued

1/ Composition: TGAI = Technical grade of the active ingredient; PAI = pure active ingredient; TEP = Typical end-use product;
2/ The use patterns are coded as follows: A=Terrestrial, Food Crop; B=Terrestrial, Non-Food Crop; C=Aquatic, Food Crop; D=Aquatic, Non-Food; E=Greenhouse, Food Crop; F=Greenhouse, Non-Food; G=Forestry; H=Domestic Outdoor; I=Indoor.
3/ Data must be submitted within the indicated time frame, based on the date of the Guidance Document.
- 9 Month due date is January 30, 1987.
- 12 Month due date is April 30, 1987.
- 15 Month due date is July 30, 1987.
- 24 Month due date is April 30, 1988.

4/ Studies should be performed on Channel catfish as this species has shown the greatest sensitivity to benomyl.
5/ A study on an upland gamebird is required. Pending the results of that study, a Mallard duck study may not be required.
6/ If the Agency's review of environmental fate data indicates persistence and/or bioaccumulation, we will require these studies.
7/ Direct application to water(rice use). Channel catfish is preferred warmwater fish species as it has generally shown the greatest sensitivity to the technical product and is indigenous to aquatic systems contiguous to rice production areas.
8/ If the Agency's review of the caged catfish/residue monitoring study and the results of the fish early life stage study demonstrate adverse effects at similar levels, this study will be required.
9/ Methyl 2-benzimidazole carbamate (MBC) is the primary metabolite of benomyl and it is persistent.
10/ Submitted rice monitoring study was not adequate; level of benomyl detected was above Agency's level of concern. A rice monitoring study utilizing caged catfish is required.
11/ The guidelines and use patterns indicate that these data are not required.
12/ WP = Wettable powder formulation.
13/ FC = Flowable concentrate formulation.
14/ Data requirements have been deferred to exposure assessment.
15/ Studies are required on marine fish, mollusk, and shrimp.
16/ Submitted study on grass shrimp was acceptable.
17/ Pending results of the caged catfish/residue monitoring study, this data would be necessary to support the rice use.

TABLE A
GENERIC DATA REQUIREMENTS FOR METHOMYL

Data Requirement	Composition 1/	Use 2/ Pattern	Does EPA Have Data To Satisfy This Requirement? (Yes, No or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B)? Time Frame for Data Submission 3/
§158.155 Nontarget Insect					
NONTARGET INSECT TESTING - POLLINATORS:					
141-1 - Honey bee acute contact toxicity	TGAI	A,B,C,H	Yes	05001991	No
141-2 - Honey bee - toxicity of residues on foliage	TEP	A,B,C,H	Yes	00077760	No
141-4 - Honey bee subacute feeding study	(Reserved) 5/				
141-5 - Field testing for pollinators	TEP	A,B,C,H	No		No 5/
NONTARGET INSECT TESTING - AQUATIC INSECTS:					
142-1 - Acute toxicity to aquatic insects	(Reserved) 6/				
142-2 - Aquatic insect life-cycle study	(Reserved) 6/				
142-3 - Simulated or actual field testing for aquatic insects	(Reserved) 6/				
143-1 thru 143-3 - NONTARGET INSECT TESTING - PREDATORS AND PARASITES	(Reserved) 6/				

TABLE A
GENERIC DATA REQUIREMENTS FOR BENOMYL

§158.155 Nontarget Insects

1/ Composition: TGAI = Technical grade of the active ingredient; TEP = Typical end-use product.
2/ The use patterns are coded as follows: A=Terrestrial, Food Crop; B=Terrestrial, Non-Food; C=Aquatic, Food Crop; D=Aquatic, Non-Food; E=Greenhouse, Food Crop; F=Greenhouse, Non-Food; G=Forestry; H=Domestic Outdoor; I=Indoor.
3/ Currently no data are required.
4/ Reserved pending development of test methodology.
5/ As laboratory tests show benomyl to be relatively non-toxic to honey bees, no further testing is required.
6/ Reserved pending Agency's decision as to whether data requirement should be established.

TABLE B
PRODUCT SPECIFIC DATA REQUIREMENTS FOR MANUFACTURING-USE PRODUCTS CONTAINING BENOMYL

Guideline Citation and Name of Test	Test Substance1/	Guidelines Status2/	Are Data Required Yes	Are Data Required No	Footnote Number or Citation	Data Must Be Submitted Within Time Frames Listed Below3/
§158.120 Product Chemistry						
Product Identity:						
61-1 - Product Identity and Disclosure of Ingredients	TGAI	R	☐	☒	00067416, 00067421	
61-2 - Description of Beginning Materials and Manufacturing Process	TGAI	R	☒	☐	-	6 months
61-3 - Discussion of Formation of Impurities	TGAI	R	☐	☒	00151522	
Analysis and Certification of Product Ingredients						
62-1 - Preliminary Analysis	TGAI	CR	☐	☒	00151523	
62-2 - Certification of Limits	TGAI	CR	☒	☐		12 months
62-3 - Analytical Method for Enforcement of Limits	TGAI	CR	☒	☐	00151523 6/ (Partially)	12 months
Physical and Chemical Characteristics						
63-2 - Color	TGAI	R	☐	☒	00067421, 00151521	
63-3 - Physical State	TGAI	R	☐	☒	00151521	
63-4 - Odor	TGAI	R	☐	☒	00151521	
63-5 - Melting Point	TGAI	R	☐	☒	00151521	
63-6 - Boiling Point	TGAI	R	☐	☒	4/	

TABLE B
PRODUCT SPECIFIC DATA REQUIREMENTS FOR MANUFACTURING-USE PRODUCTS CONTAINING BENOMYL.

Guideline Citation and Name of Test	Test Substance1/	Guidelines Status2/	Are Data Required Yes	Are Data Required No	Footnote Number	Data Must Be Submitted Within Time Frames Listed Below3/
§158.120 Product Chemistry (continued)						
Physical and Chemical Characteristics (continued)						
63-7 - Density, Bulk Density, or Specific Gravity	TGAI	R	[ ]	[X]	00151521	
63-8 - Solubility	TGAI or PAI	R	[ ]	[X]	00151521	
63-9 - Vapor Pressure	PAI	R	[X]	[ ]	-	6 months
63-10 - Dissociation constant	PAI	R	[ ]	[X]	00151521	
63-11 - Octanol/water partition coefficient	PAI	R	[ ]	[X]	00151521	
63-12 - pH	TGAI	R	[X]	[ ]		6 months
63-13 - Stability	TGAI	R	[ ]	[X]		
Other Requirements:						
64-1 - Submittal of samples	TGAI, PAI	CR	[ ]	[X]	5	

1/ TGAI = Technical Grade of the Active Ingredient; PAI = Pure Active Ingredient.
2/ R = Required; CR = Conditionally Required.
3/ Data must be submitted within the indicated time frame, based on the date of the Guidance Document.
6 Month Due Date is October 30, 1986.
12 Month Due Date is April 30, 1987.
4/ This is not required for benomyl since it is a solid.
5/ This compound does not require the submittal of samples at this time.
6/ Information is required on the detector utilized in the gas chromatographic procedure for determining 1,3-dibutylurea (in technical benomyl).

TABLE B
PRODUCT SPECIFIC DATA REQUIREMENTS FOR MANUFACTURING-USE PRODUCTS CONTAINING BENOMYL

Data Requirement	Composition[1]		Does EPA Have Data To Satisfy This Requirement? (Yes, No or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA § 3(c)(2)(B)? Time Frame for Data Submission [2]
§158.135 Toxicology					
ACUTE TESTING					
81-1 - Acute Oral Toxicity - Rat	MP	A,B,K,P,O,H	Yes	00097277	No
81-2 - Acute Dermal Toxicity - Rabbit	MP	A,B,K,P,O,H	Yes	00064822	No
81-3 - Acute Inhalation Toxicity - Rat	MP	A,B,K,P,O,H	Yes	00097599, 00097281	No
81-4 - Primary Eye Irritation	MP	A,B,K,P,O,H	Yes	00064820, 00084579	No
81-5 - Primary Skin Irritation	MP	A,B,K,P,O,H	Yes	00064821	No
81-6 - Dermal Sensitization	MP	A,B,K,P,O,H	Yes	00097289	No
81-7 - Delayed Neurotoxicity - Hen	MP	A,B,K,P,O,H	Yes	030119-007	No

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[1] Composition: MP = Manufacturing-use product.
[2] Additional data are not required by the Agency.

II. LABELING APPENDICES

40 CFR 162.10 Labeling Requirements

Physical/Chemical Hazards Labeling Statements

Storage Instructions

Pesticide Disposal Instructions

Container Disposal Instructions

SUMMARY-1

LABEL CONTENTS

40 CFR 162.10 requires that certain specific labeling statements appear at certain locations on the label. This is referred to as format labeling. Specific label items listed below are keyed to the table at the end of this Appendix.

Item 1. PRODUCT NAME - The name, brand or trademark is required to be located on the front panel, preferably centered in the upper part of the panel. The name of a product will not be accepted if it is false or misleading.

Item 2. COMPANY NAME AND ADDRESS - The name and address of the registrant or distributor is required on the label. The name and address should preferably be located at the bottom of the front panel or at the end of the label text.

Item 3. NET CONTENTS - A net contents statement is required on all labels or on the container of the pesticide. The preferred location is the bottom of the front panel immediately above the company name and address, or at the end of the label text. The net contents must be expressed in the largest suitable unit, e.g., "1 pound 10 ounces" rather than "26 ounces." In addition to English units, net contents my be expressed in metric units. [40 CFR 162.10(d)]

Item 4. EPA REGISTRATION NUMBER - The registration number assigned to the pesticide product must appear on the label, preceded by the phrase "EPA Registration No.," or EPA Reg. No." The registration number must be set in type of a size and style similar to other print on that part of the label on which it appears and must run parallel to it. The registration number and the required identifying phrase must not appear in such a manner as to suggest or imply recommendation or endorsement of the product by the Agency. [40 CFR 162.10(e)]

Item 5. EPA ESTABLISHMENT NUMBER - The EPA establishment number, preceded by the phrase "EPA Est." is the final establishment at which the product was produced, and may appear in any suitable location on the label or immediate container. It must also appear on the wrapper or outside container of the package if the EPA establishment number on the immediate container cannot be clearly read through such wrapper or container. [40 CFR 162.10(f)]

Item 6a. INGREDIENTS STATEMENT - An ingredients statement is required on the front panel. The ingredients statement must contain the name and percentage by weight of each active ingredient and the total percentage by weight of all inert ingredients. The preferred location is immediately below the product name. The ingredients statement must run parallel with, and be clearly distinguished from, other text on the panel. It must not be placed in the body of other text. [40 CFR 162.10(g)]

SUMMARY-2

Item 6B. POUNDS PER GALLON STATEMENT - For liquid agricultural formulations, the pounds per gallon of active ingredient must be indicated on the label.

Item 7. FRONT LABEL PRECAUTIONARY STATEMENTS - Front panel precautionary statements must be grouped together, preferably within a block outline. The table below shows the minimum type size requirements for various size labels.

Size of Label on Front Panel in Square Inches	Signal Word Minimum Type Size All Capitals	"Keep Out of Reach of Children" Minimum Type Size
5 and under	6 point	6 point
above 5 to 10	10 point	6 point
above 10 to 15	12 point	8 point
above 15 to 30	14 point	10 point
over 30	18 point	12 point

Item 7A. CHILD HAZARD WARNING STATEMENT - The statement "Keep Out of Reach of Children" must be located on the front panel above the signal word except where contact with children during distribution or use is unlikely. [40 CFR 162.10(h)(1)(ii)]

Item 7B. SIGNAL WORD - The signal word (DANGER, WARNING, or CAUTION) is required on the front panel immediately below the child hazard warning statement. [40 CFR 162.10 (h)(1)(i)]

Item 7C. SKULL & CROSSBONES AND WORD "POISON" - On products assigned a toxicity Category I on the basis of oral, dermal, or inhalation toxicity, the word "Poison" shall appear on the label in red on a background of distinctly contrasting color and the skull and crossbones shall appear in immediate proximity to the word POISON. [40 CFR 162.10(h)(1)(i)]

Item 7D. STATEMENT OF PRACTICAL TREATMENT - A statement of practical treatment (first aid or other) shall appear on the label of pesticide products in toxicity Categories I, II, and III. [40 CFR 162.10(h)(1)(iii)]

Item 7E. REFERRAL STATEMENT - The statement "See Side (or Back) Panel for Additional Precautionary Statements" is required on the front panel for all products, unless all required precautionary statements appear on the front panel. [40 CFR 162.10(h)(1)(iii)]

Item 8. SIDE/BACK PANEL PRECAUTIONARY LABELING - The precautionary statements listed below must appear together on the label under the heading "PRECAUTIONARY STATEMENTS." The preferred location is at the top of the side or back panel preceding the directions for use, and it is preferred that these statements be surrounded by a block outline. Each of the three hazard warning statements must be headed by the appropriate hazard title. [40 CFR 162.10(h)(2)].

Item 8A. HAZARD TO HUMANS AND DOMESTIC ANIMALS - Where a hazard exists to humans or domestic animals, precautionary statements are required indicating the particular hazard, the route(s) of exposure and the precautions to be taken to avoid accident, injury or damage. [40 CFR 162.10(h)(2)(i)]

Item 8B. ENVIRONMENTAL HAZARD - Where a hazard exists to non-target organisms excluding humans and domestic animals, precautionary statements are required stating the nature of the hazard and the appropriate precautions to avoid potential accident, injury, or damage. [40 CFR 162.10(h)(2)(ii)]

Item 8C. PHYSICAL OR CHEMICAL HAZARD - FLAMMABILITY Precautionary statements relating to flammability of a product are required to appear on the label if it meets the criteria in the PHYS/CHEM Labeling Appendix. The requirement is based on the results of the flashpoint determinations and flame extension tests required to be submitted for all products. These statements are to be located in the side/back panel precautionary statements section, preceded by the heading "Physical/Chemical Hazards." Note that no signal word is used in conjunction with the flammability statements.

Item 9A. RESTRICTED USE CLASSIFICATION - FIFRA sec. 3(d) requires that all pesticide formulations/uses be classified for either general or restricted use. Products classified for restricted use may be limited to use by certified applicators or persons under their direct supervision (or may be subject to other restrictions that may be imposed by regulation).

In the Registration Standard, the Agency has (1) indicated certain formulations/uses are to be restricted (Section III indicates why the product has been classified for restricted use); or (2) reserved any classification decision until appropriate data are submitted.

The Regulatory Position and Rationale states whether products containing this active ingredient are classified for restricted use. If they are restricted the draft label(s) submitted to the Agency as part of your application must reflect this determination (see below).

If you do not believe that your product should be classified for restricted use, you must submit any information and rationale with your application for reregistration. During the Agency's review of your application, your proposed classification determination will be evaluated in accordance with the provisions of 40 CFR 162.11(c). You will be notified of the Agency's classification decision.

SUMMARY-4

Classification Labeling Requirements

If your product has been classified for restricted use, the following label requirements apply:

1. All uses restricted.

a. The statement "Restricted Use Pesticide" must appear at the top of the front panel of the label. The statement must be set in type of the same minimum size as required for human hazard signal word (see table in 40 CFR 162.10(h)(1)(iv)

b. Directly below this statement on the front panel, a summary statement of the terms of restriction must appear (including the reasons for restriction if specified in Section I). If use is restricted to certified applicators, the following statement is required: "For retail sale to and use only by Certified Applicators or persons under their direct supervision and only for those uses covered by the Certified Applicator's Certification."

2. Some but not all uses restricted. If the Regulatory Position and Rationale states that some uses are classified for restricted use, and some are unclassified, several courses of action are available:

a. You may label the product for Restricted use. If you do so, you may include on the label uses that are unrestricted, but you may not distinguish them on the label as being unrestricted.

b. You may delete all restricted uses from your label and submit draft labeling bearing only unrestricted uses.

c. You may "split" your registration, i.e., register two separate products with identical formulations, one bearing only unrestricted uses, and the other bearing restricted uses. To do so, submit two applications for reregistration, each containing all forms and necessary labels. Both applications should be submitted simultaneously. Note that the products will be assigned separate registration numbers.

Item 9B [There is no Item 9B].

Item 9C. MISUSE STATEMENT - All products must bear the misuse statement, "It is a violation of Federal law to use this product in a manner inconsistent with its labeling." This statement appears at the beginning of the directions for use, directly beneath the heading of that section.

Item 10A. REENTRY STATEMENT - If a reentry interval has been established by the Agency, it must be included on the label. Additional worker protection statements may be required in accordance with PR Notice 83-2, March 29, 1983.

Item 10B [There is no Item 10B].

Item 10C. STORAGE AND DISPOSAL BLOCK - All labels are required to bear storage and disposal statements. These statements are developed for specific containers, sizes, and chemical content. These instructions must be grouped and appear under the heading "Storage and Disposal" in the directions for use. This heading must be set in the same type sizes as required for the child hazard warning. Refer to Appendix II, STOR, PEST/DIS, and CONT/DIS to determine the storage and disposal instructions appropriate for your products.

Item 10D. DIRECTIONS FOR USE - Directions for use must be stated in terms which can be easily read and understood by the average person likely to use or to supervise the use of the pesticide. When followed, directions must be adequate to protect the public from fraud and from personal injury and to prevent unreasonable adverse effects on the environment. [40 CFR 162.10]

COLLATERAL LABELING

Bulletins, leaflets, circulars, brochures, data sheets, flyers, or other written or graphic printed matter which is referred to on the label or which is to accompany the product are termed collateral labeling. Such labeling may not bear claims or representations that differ in substance from those accepted in connection with registration of the product. It should be made part of the response to this notice and submitted for review.

SUMMARY-6

LABELING REQUIREMENTS OF THE FIFRA, AS AMENDED

ITEM	LABEL ELEMENT	APPLICABILITY OF REQUIREMENT	PLACEMENT ON LABEL		COMMENTS
			REQUIRED	PREFERRED	
1	Product name	All products	Front panel	Center front panel	
2	Company name and address	All products	None	Bottom front panel or end of label text	If registrant is not the producer, must be qualified by "Packed for . . .," "Distributed by. . .," etc.
3	Net contents	All products	None	Bottom front panel or end of label text	May be in metric units in addition to U.S. units
4	EPA Reg. No.	All products	None	Front panel	Must be in similar type size and run parallel to other type.
5	EPA Est. No.	All products	None	Front panel, immediately before or following Reg. No.	May appear on the container instead of the label.
6A	Ingredients statement	All products	Front panel	Immediately following product name	Text must run parallel with other text on the panel.
6B	Pounds/gallon statement	Liquid products where dosage given as lbs. ai/unit area	Front panel	Directly below the main ingredients statement	
7	Front panel precautionary statements	All products	Front panel		All front panel precautionary statements must be grouped together, preferably blocked.
7A	Keep Out of Reach of Children (Child hazard warning)	All products	Front panel	Above signal word	Note type size requirements.
7B	Signal word	All products	Front panel	Immediately below child hazard warning	Note type size requirements.

SUMMARY-7

ITEM	LABEL ELEMENT	APPLICABILITY OF REQUIREMENT	PLACEMENT ON LABEL		COMMENTS
			REQUIRED	PREFERRED	
7C	Skull & crossbones and word POISON (in red)	All products which are Category I based on oral, dermal, or inhalation toxicity	Front panel	Both in close proximity to signal word	
7D	Statement of practical treatment	All products in Categories I, II, and III	Category I: Front panel unless referral statement is used. Others: Grouped with side panel precautionary statements.	Front panel for all.	
7E	Referral statement	All products where precautionary labeling appears on other than front panel.	Front panel		
8	Side/back panel precautionary statements	All products	None	Top or side of back panel preceding directions for use	Must be grouped under the headings in 8A, 8B, and 8C; preferably blocked.
8A	Hazards to humans and domestic animals	All products in Categories I, II, and III	None	Same as above	Must be preceded by appropriate signal word.
8B	Environmental hazards	All products	None	Same as above	Environmental hazards include bee caution where applicable.

SUMMARY-8

ITEM	LABEL ELEMENT	APPLICABILITY OF REQUIREMENT	PLACEMENT ON LABEL		COMMENTS
			REQUIRED	PREFERRED	
[illegible]	Physical or chemical hazards	All pressurized products, others with flash points under 150°F	None	Same as above	
[illegible]	Restricted block	All restricted products	Top center of front panel	Preferably blocked	Includes a statement of the terms of restriction. The words "RESTRICTED USE PESTICIDE" must be same type size as signal word.
[illegible]	Misuse statement	All products	Immediately following heading of directions for use		
[illegible]	Reentry statement	All cholinesterase inhibitors	In the directions for use	Immediately after misuse statement	
[illegible]	Storage and disposal block	All products	In the directions for use	Immediately before specific directions for use or at the end of directions for use	Must be set apart and clearly distinguishable from from other directions for use.
[illegible]	Directions for use	All products	None	None	May be in metric as well as U.S. units

PHYS/CHEM-1

PHYSICAL/CHEMICAL HAZARDS

Criteria	Required Label Statement
I. Pressurized Containers	
A. Flashpoint at or below 20°F; or if there is a flashback at any valve opening.	Extremely flammable. Contents under pressure. Keep away from fire, sparks, and heated surfaces. Do not puncture or incinerate container. Exposure to temperatures above 130°F may cause bursting.
B. Flashpoint above 20°F and not over 80°F; or if the flame extension is more than 18 inches long at a distance of 6 inches from the valve opening.	Flammable. Contents under pressure. Keep away from heat, sparks, and flame. Do not puncture or incinerate container. Exposure to temperatures above 130°F may cause bursting.
C. All Other Pressurized Containers	Contents under pressure. Do not use or store near heat or open flame. Do not puncture or incinerate container. Exposure to temperatures above 130°F may cause bursting.
II. Non-Pressurized Containers	
A. Flashpoint at or below 20°F.	Extremely flammable. Keep away from fire, sparks, and heated surfaces.
B. Flashpoint above 20°F and not over 80°F.	Flammable. Keep away from heat and open flame.
C. Flashpoint over 80°F and not over 150°F.	Do not use or store near heat and open flame.
D. Flashpoint above 150°F.	None required.

STOR-1

STORAGE INSTRUCTIONS FOR PESTICIDES

Heading:

All products are required to bear specific label instructions about storage and disposal. Storage and disposal instructions must be grouped together in the directions for use portion of the label under the heading STORAGE AND DISPOSAL. Products intended solely for domestic use need not include the heading "STORAGE AND DISPOSAL."

Storage Instructions:

All product labels are required to have appropriate storage instructions. Specific storage instructions are not prescribed. Each registrant must develop his own storage instructions, considering, when applicable, the following factors:

1. Conditions of storage that might alter the composition or usefulness of the pesticide. Examples could be temperature extremes, excessive moisture or humidity, heat, sunlight, friction, or contaminating substances or media.

2. Physical requirements of storage which might adversely affect the container of the product and its ability to continue to function properly. Requirements might include positioning of the container in storage, storage or damage due to stacking, penetration of moisture, and ability to withstand shock or friction.

3. Specifications for handling the pesticide container, including movement of container within the storage area, proper opening and closing procedures (particularly for opened containers), and measures to minimize exposure while opening or closing container.

4. Instructions on what to do if the container is damaged in any way, or if the pesticide is leaking or has been spilled, and precautions to minimize exposure if damage occurs.

5. General precautions concerning locked storage, storage in original container only, and separation of pesticides during storage to prevent cross-contamination of other pesticides, fertilizer, food, and feed.

6. General storage instructions for household products should emphasize storage in original container and placement in locked storage areas.

PEST/DIS-1

PESTICIDE DISPOSAL INSTRUCTIONS

The label of all products, except those intended solely for domestic use, must bear explicit instructions about pesticide disposal. The statements listed below contain the exact wording that must appear on the label of these products:

1. The labels of all products, except domestic use, must contain the statement, "Do not contaminate water, food, or feed by storage or disposal."

2. Except those products intended solely for domestic use, the labels of all products that contain active ingredients that are Acute Hazardous Wastes (see list in this Appendix) or are assigned to Toxicity Category I on the basis of oral or dermal toxicity, skin or eye irritation potential, or Toxicity Category I or II on the basis of acute inhalation toxicity must bear the following pesticide disposal statement:

> "Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous-Waste representative at the nearest EPA Regional Office for guidance."

3. The labels of all products, except those intended for domestic use, containing active or inert ingredients that are Toxic Hazardous Wastes (see list in this Appendix) or meet any of the criteria in 40 CFR 261, Subpart C for a hazardous waste must bear the following pesticide disposal statement:

> "Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance."

4. Labels for all other products, except those intended for domestic use, must bear the following pesticide disposal statement:

> "Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility."

5. Products intended for domestic use only must bear the following disposal statement: "Securely wrap original container in several layers of newspaper and discard in trash."

PEST/DIS-2

PESTICIDE ACTIVE INGREDIENTS THAT ARE ACUTE HAZARDOUS WASTES

I. PESTICIDES ON THE "E" LIST [40 CFR 261.33(e)] (with RCRA # and CAS

Acrolein	P003	107-13-1
Aldicarb	P070	116-06-3
Aldrin	P004	309-00-2
Allyl alcohol	P005	107-18-6
Aluminum phosphide	P006	1302-45-0
4-Aminopyridine (Avitrol)	P008	504-24-5
Arsenic acid	P010	7778-39-4
Arsenic pentoxide	P011	1303-28-2
Arsenic trioxide	P012	1327-53-3
Calcium cyanide	P021	592-01-8
Carbon disulfide	P022	75-15-0
p-Chloroaniline	P024	106-47-8
Cyanides (soluble cyanide salts not otherwise specified)	P030	
Cyanogen chloride	P031	506-77-4
Dieldrin	P037	60-57-1
O,O-Diethyl S-[2-ethylthio)ethyl] phosphorodithioate (disulfoton)	P039	298-04-4
O,O-Diethyl O-pyrazinyl phosphorothioate (Zinophos®)	P040	297-97-2
Dimethoate	P044	60-51-5
O,O-Dimethyl O-p-nitrophenyl phosphorothioate (methyl parathion)	P071	298-00-0
4,6-Dinitro-o-cresol and salts	P047	534-52-1
4,6-Dinitro-o-cyclohexylphenol	P034	131-89-5
Dinoseb	P020	88-85-7
Endosulfan	P050	115-29-7
Endothall	P088	129-67-9
Endrin	P051	72-20-8
Famphur	P097	52-85-7
Fluoroacetamide	P057	640-19-7
Heptachlor	P059	76-48-8
Hexachlorohexahydro-exo,exo-dimethanonaphthalene (Isodrin)	P069	465-73-6
Hydrocyanic acid	P063	74-90-8
Methomyl	P066	16752-77-5
alpha-Naphthylthiourea (ANTU)	P072	86-88-41
Nicotine and salts	P075	54-11-5
Octamethylpyrophosphoramide (OMPA, schradan)	P085	152-16-9
Parathion	P089	56-38-2
Phenylmercuric acetate (PMA)	P092	62-38-4
Phorate	P094	298-02-2
Potassium cyanide	P098	151-50-8
Propargyl alcohol	P102	107-19-7
Sodium azide	P105	26628-22-8
Sodium cyanide	P106	143-33-9
Sodium fluoroacetate	P058	62-74-8

Strychnine and salts	P108	57-24-9 60-41-3
O,O,O,O-Tetraethyl dithiopyrophosphate (sulfotepp)	P109	3689-24-5
Tetraethyl pyrophosphate	P111	107-49-3
Thallium sulfate	P115	7446-18-6
Thiofanox	P045	39196-18-4
Toxaphene	P123	8001-35-2
Warfarin (>0.3%)	P001	81-81-2
Zinc phosphide (>10%)	P122	1314-84-7

50 ACTIVES

II. PESTICIDES DERIVED FROM TRI-, TETRA-, AND PENTACHLOROPHENOLS [40 CFR 261.31]

2-Chloroethyl 2-(2,4,6-trichlorophenoxy) ethyl ether	F027	5324-22-1
Dehydroabietylammonium pentachlorophenoxide	F027	35109-57-0
Erbon	F027	136-25-4
O-ethyl O-(2,4,5-trichlorophenyl) ethylphosphonothioate	F027	327-98-0
2,2'-Methylenebis (3,4,6-trichlorophenol) (Hexachlorophene)	F027	70-30-4
—Potassium salt of	F027	67923-62-0
—Sodium salt of	F027	3247-34-5
—Disodium salt of	F027	5736-15-2
Pentachlorophenol	F027	87-86-5
—Potassium salt of	F027	7778-73-6
—Sodium salt of	F027	131-52-2
—Zinc salt of	F027	2917-32-0
—Zinc salt of N-alkyl (C_{16}-C_{18})-1,3-propanediamine	F027	
—Pentachlorophenyl laurate	F027	3772-94-9
Potassium trichlorophenate (2,4,6)	F027	2591-21-1
Potassium trichlorophenate (2,4,5)	F027	35471-43-3
Silvex	F027	93-72-1
--2-Butoxyethyl ester	F027	19398-13-1
—Butoxypolypropoxypropyl ester	F027	53404-07-2
--Butoxypropyl ester	F027	25537-26-2
—Diethanolamine salt	F027	51170-59-3
--Diisopropanolamine salt	F027	53404-09-4
--Dimethylamine salt	F027	55617-85-1
--Dipropylene glycol isobutyl ether ester	F027	53535-26-5
—Ethanolamine salt	F027	7374-47-2
--2-Ethylhexyl ester	F027	53404-76-5
--Isooctyl ester	F027	53404-14-1

—Isopropanolamine salt	F027	53404-13-0
—Monohydroxylaluminum salt	F027	69622-82-8
—Polypropoxypropyl ester	F027	83562-66-7
—Potassium salt	F027	2818-16-8
—Propylene glycol isobutyl ether ester	F027	53466-84-5
—Sodium salt	F027	37913-89-6
—Triethanolamine salt	F027	17369-89-0
—Triethylamine salt	F027	53404-74-3
—Triisopropanolamine salt	F027	53404-75-4
—Tripropylene glycol isobutyl ether ester	F027	53535-30-1
Sodium 2-(2,4,5-trichlorophenoxy) ethyl sulfate	F027	3570-61-4
Tetrachlorophenols	F027	25167-83-3
—Alkylamine*amine salt (as in fatty acids of coconut oil)	F027	
—Potassium salt	F027	53535-27-6
—Sodium salt	F027	25567-55-9
2,4,5-Trichlorophenol	F027	95-95-4
2,4,6-Trichlorophenol	F027	88-06-2
2,4,5-Trichlorophenol salt of 2,6-bis[(dimethylamino)methyl] cyclohexanone	F027	53404-83-4
2,4,5-Trichlorophenol, sodium salt	F027	136-32-3
2,4,6-Trichlorophenol, sodium salt	F027	3784-03-0
2,4,5-Trichlorophenoxyacetic acid	F027	93-79-8
—Alkyl C-12 amine salt	F027	53404-84-5
—Alkyl C-13 amine salt	F027	53404-85-6
—Alkyl C-14 amine salt	F027	53535-37-8
—N,N-diethylethanolamine salt	F027	53404-86-7
—Dimethylamine salt	F027	6369-97-7
—N,N-dimethyllinoleylamine salt	F027	53404-88-9
—N,N-dimethyloleylamine salt	F027	53404-89-0
—N-oleyl-1,3-propylene diamine salt	F027	53404-87-8
—Sodium salt	F027	13560-99-1
—Triethanolamine salt	F027	3813-14-7
—Triethylamine salt	F027	2008-46-0
—Alkyl (C3H7 - C7H9) ester	F027	
—Amyl ester	F027	120-39-8
—Butoxyethoxypropyl ester	F027	1928-58-1
—2-Butoxyethyl ester	F027	2545-59-7
—Butoxypropyl ester	F027	1928-48-9
—Butyl ester	F027	93-79-8
—Dipropylene glycol isobutyl ether ester	F027	53535-31-2
—2-Ethylhexyl ester	F027	1928-47-8
—Isobutyl ester	F027	4938-72-1

—Isopropyl ester	F027	93-78-7
—Propylene glycol isobutyl ether ester	F027	53466-86-7
—Tripropylene glycol isobutyl ether ester	F027	53535-32-3
4-(2,4,5-Trichlorophenoxy)butyric acid [2,4,5-TB]	F027	93-80-1
2-(2,4,5-Trichlorophenoxy)ethyl hydrogen sulfate [2,4,5-TES]	F027	69633-04-1
1,4',5'-Trichloro-2'-(2,4,5-trichlorophenoxy) methanesulfonanilide [Edolan U]	F027	69462-14-2

PESTICIDES THAT ARE TOXIC HAZARDOUS WASTES

PESTICIDES ON THE "F" LIST [40 CFR 261.33(f)] (with	RCRA #, and	CAS #
Acetone	U002	67-64-1
Acrylonitrile*	U009	107-13-1
Amitrole	U011	61-82-5
Benzene*	U019	71-43-2
Bis(2-ethylhexyl)phthalate	U028	117-81-7
Cacodylic acid	U136	75-60-5
Carbon tetrachloride*	U211	56-23-5
Chloral (hydrate) (chloroacetaldehyde)	U034	302-17-0
Chlordane, technical*	U036	57-74-9
Chlorobenzene*	U037	108-90-7
4-Chloro-m-cresol	U039	59-50-7
Chloroform*	U044	67-66-3
o-Chlorophenol	U048	95-57-8
Creosote	U051	8021-39-4
Cresylic acid (cresols)*	U052	1319-77-3
Cyclohexane	— U056	110-82-7
Cyclohexanone	U057	108-94-1
Decachlorooctahydro-1,3,4-metheno-2H-cyclobuta[c,d]-pentalen-2-one (Kepone, chlordecone)	U142	143-50-0
1,2-Dibromo-3-chloropropane (DBCP)	U066	96-12-8
Dibutyl phthalate	U069	84-74-2
S-2,3-(Dichloroallyl diisopropyl-thiocarbamate) (diallate,Avadex)	U062	2303-16-4
o-Dichlorobenzene*	U070	95-50-1
p-Dichlorobenzene*	U072	106-46-7
Dichlorodifluoromethane (Freon 12®)	U075	75-71-8
3,5-Dichloro-N-(1,1-dimethyl-2-propynyl) benzamide (pronamide, Kerb®)	U192	23950-58-5
Dichloro diphenyl dichloroethane (DDD)	U060	72-54-8
Dichloro diphenyl trichloroethane (DDT)	U061	50-29-3
Dichloroethyl ether	U025	1191-17-9
2,4-Dichlorophenoxyacetic, salts and esters (2,4-D)*	U240	94-75-7
1,2-Dichloropropane	U083	8003-19-8
1,3-Dichloropropene (Telone)	U084	542-75-6
Dimethyl phthalate	U102	131-11-3
Epichlorohydrin (1-chloro-2,3-epoxypropane)	U041	106-89-8
Ethyl acetate	U112	141-78-6
Ethyl 4,4'-dichlorobenzilate (chlorobenzilate)	U038	510-15-6

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*Proposed for deletion by TCLP proposal

Ethylene dibromide (EDB)	U067	106-93-4
Ethylene dichloride*	U077	107-06-2
Ethylene oxide	U115	75-21-8
Formaldehyde	U122	50-00-0
Furfural	U125	98-01-1
Hexachlorobenzene*	U127	118-74-1
Hexachlorocyclopentadiene	U130	77-47-4
Hexachloroethane*	U131	67-72-1
Hydrofluoric acid	U134	7664-39-3
Isobutyl alcohol*	U140	78-83-1
Lead acetate	U144	301-04-2
Lindane*	U129	58-89-9
Maleic hydrazide	U148	123-33-1
Mercury	U151	7439-97-6
Methoxychlor*	U247	72-43-5
Methyl alcohol (methanol)	U154	67-56-1
Methyl bromide	U029	74-83-9
Methyl chloride	U045	74-87-3
2,2'-Methylenebis (3,4,6-trichlorophenol) (hexachlorophene) [acute waste per 261.31]	U132	70-30-4
Methylene chloride*	U080	75-09-2
Methyl ethyl ketone*	U159	78-93-3
4-Methyl-2-pentanone (methyl isobutyl ketone)	U161	108-10-1
Naphthalene	U165	91-20-3
Nitrobenzene*	U169	98-95-3
p-Nitrophenol	U170	100-02-7
Pentachloroethane	U184	76-01-7
Pentachloronitrobenzene (PCNB)	U185	82-68-8
Pentachlorophenol* [acute waste per 261.31]	U242	87-86-5
Phenol*	U188	108-95-2
Pyridine*	U196	110-86-1
Resorcinol	U201	108-46-3
Safrole	U203	94-59-7
Selenium disulfide	U205	7488-56-4
Silvex [acute waste per 261.31]	U233	93-72-1
1,1,2,2-Tetrachloroethane*	U209	79-34-5
Tetrachloroethylene*	U210	127-18-4
2,3,4,6-Tetrachlorophenol* [acute waste per 261.31]	U212	
Thiram	U244	137-26-8
Toluene*	U220	108-88-3
1,1,1-Trichloroethane* (methyl chloroform)	U226	71-55-6
Trichloroethylene*	U228	79-01-6
Trichloromonofluoromethane (Freon 11®)	U121	75-69-4
2,4,5-Trichlorophenol* [acute waste per 261.31]	U230	95-95-4
2,4,6-Trichlorophenol* [acute waste per 261.31]	U231	88-06-2

2,4,5-Trichlorophenoxyacetic acid (2,4,5-T)* [acute waste per 261.31]	U232	93-76-5
Warfarin (<0.3%)	U248	81-81-2
Xylene	U239	1330-20-7
Zinc phosphide (<10%)	U249	1314-84-7

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CONT/DIS-1

CONTAINER DISPOSAL INSTRUCTIONS

The label of each product must bear container disposal instructions appropriate to the type of container.

1. Domestic use products must bear one of the following container disposal statements:

Container Type	Statement
Non-aerosol products (bottles, cans, jars)	Do not reuse container (bottle, can, jar). Rinse thoroughly before discarding in trash.
Non-aerosol products (bags)	Do not reuse bag. Discard bag in trash.
Aerosol products	Replace cap and discard containers in trash. Do not incinerate or puncture.

2. All other products must bear container disposal instructions, based on container type, listed below:

Container Type	Statement
Metal containers (non-aerosol)	Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.
Plastic containers	Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.
Glass containers	Triple rinse (or equivalent). Then dispose of in a sanitary landfill or by other approved state and local procedures.
Fiber drums with liners	Completely empty liner by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into application equipment. Then dispose of liner in a sanitary landfill or by incineration if allowed by state and local authorities. If drum is contaminated and cannot be reused[1], dispose of in the same manner.
Paper and plastic bags	Completely empty bag into application equipment. Then dispose of empty bag in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.
Compressed gas cylinders	Return empty cylinder for reuse (or similar wording)

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[1] Manufacturer may replace this phrase with one indicating whether and how fiber drum may be reused.

III. USE INDEX APPENDIX

FINAL
SAI/MAI
c099101

BENOMYL*

TYPE PESTICIDE: Fungicide

FORMULATIONS:
Tech (95%)
FI (50%)
G (1.1%, 1.5%, 1.57%, 1.6%, 1.95%)
WP (25%, 50%)
FlC (0.25 lb/gal or 3%, 75% (dry))
SC/L (0.72 lb/gal or 10%)

GENERAL WARNINGS AND LIMITATIONS: Do not allow benomyl to become wet during storage. Do not tank mix benomyl with lime or alkaline pesticides such as Bordeaux mixture or lime sulfur. Where the use of spray oil is recommended (apples, peanuts, pecans, stone fruits), use a nonphytotoxic superior type (60 to 70 second viscosity) spray oil.

If treatment is not effective due to the presence of a resistant strain of fungus, or if when repeated exclusive use of benomyl has led to the buildup of a resistant strain, other suitable fungicides should be used. Consult a State Cooperative Agricultural Extension Service for recommendations. Do not tank mix or alternate benomyl with formulations containing active ingredients such as 2-(4-thiazolyl)benzimidazole or diethyl 4,4'-o-phenylenebis[3-thioallophanate].

As a spray, apply with ground equipment (except as noted) using sufficient water to obtain thorough coverage. Under severe disease conditions, apply the higher rate and shorter interval specified for each crop. For tree crops, apply the higher rate for large, mature trees. For aircraft application (on specified crops only), apply the following gallons per acre: Carrots, rice and soybeans, 3 to 10; cabbage (seed crop), celery, cucurbits, peanuts, and sugar beets, 5 to 10; almonds, avocados, beans, pecans, stone fruits, and strawberries, 10 to 20; grapes, 15 to 20; roses, flowers, ornamentals, and shade trees, 20 gallons per acre minimum.

Dosage rates are given in active ingredient unless otherwise specified. For use in small gardens and orchards (less than 1 acre), application rates may be converted to pounds per 100 gallons by dividing the pounds per acre rate in half, and applying the resulting spray mixture at the rate of 4.5 gallons per 1,000 square feet. [Note: For the 50 percent wettable powder, 0.5 pound actual* per 100 gallons equals 0.5 tablespoon actual* per gallon; and, for the 75 percent dry flowable concentrate, 0.75 pound actual per 100 gallons equals 2.25 tablespoons actual* per 5 gallons.]

Definition of Terms:

*Tablespoons (tbls) or teaspoons (tsp) actual: A hypothetical quantity computed by multiplying the number (or equivalent number) of tablespoons (or teaspoons) of product by the concentration of benomyl in the formulation.

a.i. - active ingredient

max. - maximum

Chemical names used in the tank mix statements are the Common Names as listed in Appendix A immediately following the Listing of Registered Pesticide Products by Formulation.

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*benomyl[methyl 1-(butylcarbamoyl)-2-benzimidazolecarbamate]

BENOMYL

GENERAL WARNINGS AND LIMITATIONS (continued)

Agricultural Crop Tolerances:
Broccoli, brussels sprouts, cauliflower, chinese cabbage, collards, corn, fresh (including sweet, kernel plus corn with husk removed), corn, sweet (fodder and forage), eggplants, garlic, kale, kohlrabi, mustard greens, peppers, rutabagas, spinach, sweet potatoes, turnips (roots), and turnips (tops) - 0.2 ppm
Currants - 7 ppm
Dandelion - 10 ppm
Papaya - 3 ppm
Livestock and Poultry Tolerances:
Fat, meat, and meat byproducts of cattle, goats, hogs, horses, poultry, and sheep - 0.1 ppm
Poultry liver - 0.2 ppm

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	TERRESTRIAL FOOD CROP	—	
	(Agricultural Crops)		
/03001AA	Almond		0.2 ppm (negligible residue) nuts 1 ppm almond hulls Do not apply after full bloom through 0.75 pound per acre.
FBADMCB	Brown rot blossom and twig blight (Monilinia)	0.5-0.75 lb/A (50% WP) (75% FlC) or 0.5-0.75 tsp actual*/gal (50% WP)	Delayed dormant and foliar application. Apply at pink bud. Under severe disease conditions and on highly susceptible varieties, make a second application during half- to full bloom.

EPA Index to Pesticide Chemicals

BENOMYL

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/04001AA	Apple (preharvest/foliar postharvest)		7 ppm (pre- and/or postharvest) 70 ppm in dried apple pomace (pre- and/or postharvest) No preharvest interval through 15.0 ounces per acre. Do not graze livestock in treated orchards. With Golden Delicious, adverse effects on fruit finish and color may result; if finish and color are of primary importance do not use more than 2.0 ounces active ingredient per 100 gallons. Apply 200 to 500 gallons per acre with hydraulic ground equipment, or equivalent amounts of formulations with concentrate sprayers.
FEAJVAG	Apple scab (Venturia)	1.0-1.5 oz/ 100 gal or 0.16-0.25 tsp actual*/ gal [tank mixes] (50% WP) (75% FlC) or 2.0-3.0 oz/ 100 gal or 0.375-0.75 tsp actual*/ gal (50% WP)	Delayed dormant and foliar application. Apply at one-half inch green tip. Repeat at 7 to 14 day intervals or as needed through cover sprays. If an application is during an infection period, apply the high rates as soon as possible after the infection period in order to deactivate scab and prevent further infection. For tank mixes, apply with 9.6 ounces a.i. of mancozeb per 100 gallons of water; or with 6.0 to 8.0 ounces a.i. of captan per 100 gallons. One quart of spray oil per 100 gallons water may be added to the mancozeb tank mix. Apply the high rates for varieties more susceptible to powdery mildew. May be tank mixed with maneb or captan at the 0.375 to 0.5 teaspoon actual* per gallon rate.
FMAUSAH	Flyspeck (Schizothyrium)		
FFACPDJ	Powdery mildew (Podosphaera)		
FCAFGAL	Sooty blotch (Gloeodes)		

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	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Apple (preharvest/foliar postharvest) (continued)		
FIBFBAW FIBFGAN FIBFPAO	Fruit rot (Botrytis) Fruit rot (Gloeosporium) Fruit rot (Penicillium)	3.0 oz/100 gal (50% WP) (75% FlC) or 0.5 tsp actual*/gal (50% WP)	Foliar application. Apply once, anytime from 3 weeks before harvest up to day of harvest.
FGAVVAG	Overwintering scab (Venturia)	4.0 oz/100 gal (50% WP)	Foliar application after harvest. Apply thoroughly to foliage before leaf drop.
/04001EA /04003EA	Apple (postharvest) Pear (postharvest)	—	7 ppm (pre- and/or postharvest) 70 ppm in dried apple pomace (pre- and/or postharvest) Postharvest treatment to fruit through 300 ppm suspension.
FIBFBAW FIBFGAN FIBFPAO	Fruit rot (Botrytis) Fruit rot (Gloeosporium) Fruit rot (Penicillium)	3.84-4.0 oz/100 gal [288-300 ppm a.i.] (50% WP) (75% FlC) or 1 volume 3% FlC/100 volumes spray suspension [300 ppm a.i.] (3% FlC) or 0.75 tsp actual*/gal (50% WP)	Postharvest treatment to fruit to be held in storage. Apply the 50 or 75 percent formulations as a dip or spray, and the 3 percent as a spray. This treatment is recommended in conjunction with the preharvest spray.

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	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/05001AA	Apricot (preharvest)		15 ppm (pre- and/or postharvest) No preharvest interval through 1.0 pound per acre. Do not graze livestock in treated orchards. Treatment is most effective if applied just before rainfall. For aircraft application, fly over every row or center. [Benomyl does not control peach leaf curl, shot hole (Coryneum blight), or bacterial blast.]
/05002AA	Cherry (preharvest/foliar postharvest)		
/05003AA	Nectarine (preharvest)		
/05004AA	Peach (preharvest)		
/05005AA	Plum (preharvest)		
/05006AA	Prune (preharvest)		
FBADMCB	Brown rot blossom and twig blight (Monilinia)	0.375-1.0 lb/A (50% WP) (75% FlC) or 0.5-1 tsp actual*/gal (50% WP)	Delayed dormant, foliar application, and foliar application after harvest (cherry). East of the Rocky Mountains: Apply 0.375 to 0.75 pound per acre on trees up to 12 feet tall, or 0.75 to 1.0 pound per acre on trees over 12 feet. For brown rot blossom blight, apply at early bloom stages (apricots-red bud; peaches, nectarines-pink bud; cherries-early popcorn; plums and prunes-green tip). May be applied with spray oil for that first application only. Apply a second time at 75 to 100 percent bloom. If blossoming is prolonged or conditions favorable for disease continue, apply at petal fall. For brown rot of fruit (after blossom blight sprays), apply twice beginning 3 weeks before harvest up to day of harvest. For peach scab and powdery mildew, apply the same schedule as for brown rot blossom blight, with additional applications at shuck split, shuck fall, and 14 days later. For cherry leaf spot, apply the same schedule as for brown rot blossom blight, and continue at 10 to 14 day intervals through harvest. Apply again 2 to 3 weeks after harvest. West of the Rocky Mountains: Apply 0.75 to 1.0 pound per acre. For brown rot blossom blight, make first application as above. If blossoming is prolonged or conditions favorable for disease contin-
FIALMCB	Brown rot of fruit (Monilinia)		
FMBCCDJ	Cherry leaf spot (Coccomyces)		
FEAJCCV	Peach scab (Cladosporium)		
FFACQBB	Powdery mildew		

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	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Apricot (preharvest) cluster (continued)		
			ue, apply a second time 14 days later. For brown rot of fruit, apply before rain anytime from 3 weeks before harvest up to the day of harvest. If conditions favorable for disease continue, or harvest is prolonged, apply again. Preharvest applications are most effective when applied with ground equipment. For powdery mildew and cherry leaf spot, follow directions for East of the Rocky Mountains.
		0.25-0.5 lb/ 100 gal or 0.5-1 tbls actual*/ 2 gal (50% WP)	Delayed dormant, foliar application, and foliar application after harvest (cherry). For brown rot blossom blight, apply high rate (in combination with dormant oil) prior to bud break. Apply low rate at early bloom (popcorn, red bud, or green tip) and at full bloom. Apply once or twice at low rate beginning 3 weeks before harvest. In addition to the schedule for brown rot blossom blight, apply low rate at shuck split and shuck fall for peach scab, at shuck fall and first cover for powdery mildew, and 2 to 3 weeks after harvest for cherry leaf spot.
		0.25 tbls actual*/gal (50% WP)	Apply as above. May be tank mixed with maneb or captan for peaches, or with captan for cherries.
/05001EA /05002EA /05003EA /05004EA /05005EA /05006EA	Apricot (postharvest) Cherry (postharvest) Nectarine (postharvest) Peach (postharvest) Plum (postharvest) Prune (postharvest)		15 ppm (pre- and/or postharvest) Postharvest treatment to fruits through 300 ppm suspension. [Benomyl does not control fruit rots caused by Rhizopus spp. and Alternaria spp.]
FICZQBB	Postharvest fruit rots	0.25 lb/ 100 gal [300 ppm a.i.] (50% WP) (75% FlC) or	Postharvest treatment to fruits. Apply as soon as possible after harvest. The 50 and 75 percent formulations may be applied as a dip or spray (water or wax spray).

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Apricot (postharvest) cluster continued		
		1 volume 3% F1C/ 100 volumes spray [300 ppm a.i.] (3% F1C) or 0.75 tsp actual*/gal (50% WP)	
/06001AA	Avocado		3 ppm 14 day preharvest interval through 1.25 pound per acre.
FAAAGAP	Anthracnose (Glomerella)	0.5-1.25 lb/A (50% WP) (75% F1C) or 0.5-0.75 tsp actual*/gal [1-1.5 gal/tree] (50% WP)	Use limited to FL. Foliar application. Apply when buds swell and repeat at 3 to 4 week intervals.
FMCBCBM	Cercospora leaf and fruit spot		
FEAJSCB	Scab (spot anthracnose) (Sphaceloma)		
/06002AA	Banana (preharvest)		1 ppm preharvest and postharvest, of which not more than 0.2 ppm (negligible residue) shall be present in the pulp after the peel is removed and discarded. No preharvest interval through 2.0 ounces per acre. May be applied by aircraft.
FMBOCBM	Sigatoka disease (Cercospora leaf spot)	1.0-2.0 oz/A (50% WP)	Foliar application. As a spray oil mixture, apply in 1 to 2 gallons of nonphytotoxic spray oil per acre. Or, as an oil-water emulsion, apply in 0.5 to 1 gallon of nonphytotoxic spray oil per acre with an emulsifier added at the rate of 1 percent of the oil volume. Apply a minimum of 2.5 gallons of spray per acre by aircraft, and at least 5 gallons per acre with mist blowers. Apply at 2 to 3 week intervals throughout the complete crop cycle.

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	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Banana (preharvest) (continued)		
		0.5-1 tsp actual*/ 1,000 sq.ft (50% WP)	Foliar application. Apply as an oil water emulsion using 1.5 fluid ounces of nonphytotoxic spray oil. Apply at 2 to 3 week intervals throughout the complete crop cycle.
/06002EA	Banana (postharvest)		1 ppm preharvest and postharvest, of which not more than 0.2 ppm (negligible residue) shall be present in the pulp after the peel is removed and discarded. Postharvest dip or spray through 600 ppm a.i. suspension.
FIAXQBB FIBFQBB	Crown rot Surface molds	0.75-1.5 tsp actual*/gal [300-600 ppm a.i.] (50% WP)	Postharvest treatment to fruits. Apply as a dip or spray to thoroughly wet crowns and fruit.
/28001AA	Beans		2 ppm 50 ppm bean vine forage 14 day preharvest interval for snap or dry beans, or 28 day preharvest interval for lima beans through 1.0 pound per acre. Use on beans grown as fresh vegetables, for processing, or for the dry bean market. Do not use where crop is grown only for forage purposes.
FHACBAW FHANSAQ	Gray mold (Botrytis) White mold (Sclerotinia)	0.75-1.0 lb/A (50% WP) (75% FlC) or 0.026 oz/0.5 gal/100 sq.ft or 0.125-0.25 tbls actual*/0.25-0.5 gal/100 sq.ft (50% WP) or	Foliar application. Apply at 25 to 50 percent bloom. Repeat at peak bloom. For narrow-row (20 to 24 inches) irrigated dry beans in CO, MT, NE, and WY, apply at initial bloom and repeat 7 to 10 days later (only partial control of white mold may result).

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Beans (continued)		
		0.04 oz/gal or 0.25-1 tbls actual*/gal (50% WP)	
FHANSAQ	White mold (Sclerotinia)	0.75-1.0 lb/A (50% WP)	Use limited to MN and WI. Foliar application. Apply at 25 to 50 percent bloom. Repeat at peak bloom. For aerial application, apply in 4 to 10 gallons per acre.
/01002AA	**Blackberry**		7 ppm 3 day preharvest interval through 0.375 pound per acre.
/01003AA	**Boysenberry**		
/01004AA	**Dewberry**		
/01005AA	**Loganberry**		
/01006AA	**Raspberry**	—	
FIBFBAW	Fruit rot (Botrytis)	0.375 lb/A (50% WP) (75% FlC) or 0.25 tbls actual*/gal/300 sq.ft or 0.375 tsp actual*/gal (50% WP)	Foliar application. Apply at early (5 to 10 percent) bloom and at full bloom. Make up to 3 additional applications at 14 day intervals as needed.
FIBFPAO	Fruit rot (Penicillium)		
FFACSCO	Powdery mildew (Sphaerotheca)		
/01009AA	**Blueberry**		7 ppm 21 day preharvest interval through 0.5 pound per acre. Do not make more than 4 applications before harvest.
FAAAGAN	Anthracnose (leaf spot) (Gloeosporium)	0.5 lb/A (50% WP) (75% FlC) or 0.5 tsp actual*/gal (50% WP)	Foliar and postharvest application. Apply when disease first appears and make 1 additional application 14 days later. After harvest, make up to 4 applications to the bushes at 14 day intervals as needed.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Blueberry (continued)		
FBADBAW	Botrytis blossom blight	0.5 lb/A (50% WP) (75% FlC) or 0.5 tsp actual*/gal (50% WP)	Delayed dormant and foliar application. Apply at green tip. Repeat at 7 to 10 day intervals through petal fall.
FIBMMCB	Mummy berry (Monilinia vaccinii-corymbosi)		
	Boysenberry		See Blackberry cluster.
/13007BA	**Cabbage** (seed crop)		0.2 ppm Do not graze treated areas. Do not use seed or plant parts for food or feed purposes.
FICXSAQ	Sclerotinia stalk rot	1.0 lb/5-10 gal/A (50% WP) (75% FlC)	Use limited to Pacific Northwest. Foliar application. Apply by aircraft at first petal fall. Make 2 additional applications at 14 day intervals if conditions favor disease development. Add a suitable spreader-sticker.
/28073AA	**Carrots**		0.2 ppm 4 day preharvest interval through 0.5 pound per acre.
FHANSAQ	White rot (Sclerotinia)	0.125-0.5 lb/A (50% WP)	Foliar application. Apply when disease first appears. Repeat at 7 to 10 day intervals.
/13002AA	**Celery**		3 ppm 7 day preharvest interval through 0.25 pound per acre.
FBAMCBM	Early blight (Cercospora)	0.125-0.25 lb/A (50% WP) (75% FlC) or 0.5 tsp actual*/ 0.5 gal/150 sq.ft plant bed (50% WP) or	Foliar application. Apply when disease first appears. Repeat at 7 to 10 day intervals.
FBASSBL	Late blight (Septoria)		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Celery (continued)		
		0.125-0.25 tsp actual*/gal (50% WP)	
	Cherry (preharvest/foliar postharvest)		See Apricot (preharvest) cluster.
	Cherry (postharvest)		See Apricot (postharvest) cluster.
/02000AA	**Citrus Fruits**		10 ppm (pre- and/or postharvest) 50 ppm in dried citrus pulp (pre- and/or postharvest) No preharvest through 1.0 pound per acre; or, do not apply later than mid-July through 1.5 pounds per acre. Do not graze livestock in treated groves.
FIBFPAO	Blue mold (Penicillium italicum)	0.5-1.0 lb/A (50% WP) (75% FlC) or 0.5-1 tsp actual*/gal (50% WP)	Foliar application. Apply once anytime from 3 weeks prior to harvest up to day of harvest.
FIBFPAO	Green mold (Penicillium digitatum)		
FICIQBB	Stem-end rot		
FMAYMCO	Greasy spot (Mycosphaerella)	0.75-1.5 lb/A (50% WP) (75% FlC) or 0.75-1 tsp actual*/gal (50% WP)	Foliar application. Apply once during the period mid-June to mid-July.
FAABEAH	Scab (spot anthracnose) (Elsinoe)	0.75-1.5 lb/A (50% WP) (75% FlC) or 0.25 tbls actual*/ 2 gal [max. 10 gal/tree] (50% WP) or	Foliar application. Under conditions of severe disease pressure, apply at pinhead stage (just prior to first flush). Repeat at two-thirds petal fall. Otherwise, make a single application at two-thirds petal fall.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Citrus Fruits (continued)		
		0.75-1 tsp actual*/gal (50% WP)	
/02000EA	Citrus Fruits (postharvest)		10 ppm (pre- and/or postharvest) 50 ppm in dried citrus pulp (pre- and/or postharvest) Postharvest treatment to fruits through 3,000 ppm wax spray suspension. The 0.72 pound per gallon or 10 percent formulation is to be used in the manufacturer's wax, prepared by a manufacturer's representative, and applied in the manufacturer's wax spray applicator.
FIBFPAO	Blue mold (Penicillium italicum)	0.5-1.0 lb/100 gal [600-1,200 ppm a.i.] (50% WP) (75% FlC) or 1-2 volumes 3% FlC/50 volumes [600-1,200 ppm a.i.] (3% FlC) or 1-2 tsp actual*/gal (50% WP)	Postharvest treatment to citrus fruits. Apply as a dip, flood, or spray. May be applied in water or in a citrus wax spray. Do not immerse fruit more than 5 minutes in suspensions with 50 or 75 percent formulations. Use the higher rate on more susceptible fruits and when excessive inoculum levels are present. If fruit is stored wet after treatment, adjust storage conditions to obtain fruit drying within 48 hours.
FIBFPAO	Green mold (Penicillium digitatum)		
FICIQBB	Stem-end rot		
		1 volume 10% SC/L/100 volumes wax [1,000 ppm a.i.] (0.72 lb/gal or 10% SC/L)	Postharvest treatment to citrus fruits. Apply 1 gallon of wax with benomyl to each 5,000 pounds of fruit.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Citrus Fruits (postharvest) (continued)		
		2.0 lb/100 gal citrus wax [2,400 ppm a.i.] (50% WP) (75% FlC) or 2 volumes 3% FlC/25 volumes wax emulsion [2,400 ppm a.i.] (3% FlC) or 1 volume 10% SC/L/33 volumes wax [3,000 ppm a.i.] (0.72 lb/gal or 10% SC/L) or 4 tsp actual*/gal wax (50% WP)	Postharvest treatment to citrus fruits. Apply as a spray to control Penicillium spp. sporulation.
/10010AA	Cucumber		1 ppm No preharvest interval through 0.25 pound per acre.
/10001AA	Melons		
/10011AA	Pumpkin		
/10013AA	Summer Squash		
/10014AA	Winter Squash		
FAAACDP	Anthracnose (Colletotrichum)	0.125-0.25 lb/A (50% WP) (75% FlC) or 0.0053 oz/100 sq.ft or 0.25 oz/12.5 gal (50% WP) or	Foliar application. May be applied by aircraft at the high rate. Apply when plants begin to run or when disease first appears. Repeat at 7 to 14 day intervals as needed. For target spot, apply at 7 day intervals as needed.
FBAQMCO	Gummy stem blight (Mycosphaerella)		
FFACEBJ	Powdery mildew (Erysiphe)		
FMBCCEK	Target leaf spot (Corynespora) (on cucumbers)		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Cucumber cluster (continued)		
		0.1-0.17 tsp actual*/0.5 gal/100 sq.ft or 0.028-0.056 tsp actual*/100 sq.ft or 0.125-0.25 tsp actual*/gal or 0.125-0.25 tbsl actual*/gal (50% WP)	
	Dewberry		See Blackberry cluster.
/01014AA	Grapes		10 ppm 50 ppm raisins 125 ppm in dried grape pomace and raisin waste 7 day preharvest interval through 0.75 pound per acre. [Benomyl does not control bunch rots caused by Rhizopus spp., Alternaria spp., or Diplodia spp.]
FIADMAV	Bitter rot (Melanconium)	0.375-0.75 lb/A (50% WP) (75% FlC) or 0.75-1.5 tbls actual*/2 gal or 0.375-0.75 tsp actual*/gal (50% WP)	Use limited to East of the Rocky Mountains. Delayed dormant and foliar application. Apply when foliage first develops. Repeat at 14 to 2[illegible] day intervals, or as needed, until berries are full size.
FIBFGBG	Black rot (Guignardia)		
FFACUAB	Powdery mildew (Uncinula)		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Grapes (continued)		
FIARBAW	Botrytis bunch rot	0.5-0.75 lb/A (50% WP) (75% WP) or 1-1.25 tbls actual*/2 gal or 0.5-0.75 tsp actual*/gal (50% WP)	Foliar application. Apply at first bloom (no later than 5 percent bloom) and repeat 14 days later if severe disease conditions persist. Make an additional application 3 to 4 weeks before harvest or when sugar begins to build. Repeat 14 days later if conditions favorable for disease persist.
	Loganberry		See Blackberry cluster.
/03007AA	Macadamia Nut	—	0.2 ppm (neglible residue) nuts Do not apply after bloom period through 0.875 pound per acre.
FBADBAW	Botrytis blossom blight	0.875 lb/A (50% WP) (75% FlC) or 0.875 tsp actual*/gal (50% WP)	Use limited to HI. Foliar application. Apply 1 to 2 weeks prior to bloom. Repeat at 7 to 14 day intervals through the bloom period. A suitable surfactant may be added.
/06007AA	Mango		3 ppm 14 day preharvest interval through 1.0 pound per acre.
FAAAGAP	Anthracnose (flower and twig blight/fruit spot) (Glomerella)	0.5-1.0 lb/A (50% WP) (75% FlC) or 0.5-1 tsp actual*/gal (50% WP)	Foliar application. Apply at first appearance of panicles (approximately 2 inches long). Repeat at weekly intervals until all fruits are set. Continue at 3 to 4 week intervals.
	Melons		See Cucumber cluster.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/16003AA	Mushrooms		10 ppm 2 day preharvest interval through 1.0 ounce per 1,000 square feet.
FGAFVAK	Verticillium spot (dry bubble)	0.5 lb/100 gal or 1.0 oz/1,000 sq.ft (50% WP) (75% FlC) or 1.5 tsp actual*/gal (50% WP)	Soil application. Apply 12.5 gallons suspension per 1,000 square feet. Apply to bed surface immediately after casing and repeat at pinning. Or, if disease has occurred, apply to beds after picking and repeat 10 days later.
	Nectarine (preharvest)		See Apricot (preharvest) cluster.
	Nectarine (postharvest)	—	See Apricot (postharvest) cluster.
	Peach (preharvest)		See Apricot (preharvest) cluster.
	Peach (postharvest)		See Apricot (postharvest) cluster.
/280154AA	Peanuts		0.2 ppm 2 ppm hulls 15 ppm forage or hay 14 day preharvest interval through 0.25 pound per acre. Do not graze or feed vines, hay, or hulls treated with tank mix to livestock.
FMBCCBM	Leaf spot (Cercospora)	0.125 lb/A (50% WP) (75% FlC)	Foliar application. Tank mix with 1.2 pounds a.i. mancozeb per acre. (Ascochyta web blotch and rust will also be controlled.) Spray oil may be added (0.5 to 1 quart per acre). Apply 35 to 40 days after planting or when disease first appears. Repeat at 10 to 14 day intervals.
		0.188-0.25 lb/A or 0.5 oz/12.5 gal (50% WP)	Foliar application. Apply 35 to 40 days after planting or when disease appears. Repeat at 14 to 21 day intervals.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/04003AA	Pear (preharvest/foliar postharvest)		7 ppm (pre- and/or postharvest) No preharvest interval through 15.0 ounces per acre. Do not graze livestock in treated orchards. Apply 200 to 500 gallons per acre with hydraulic ground equipment, or equivalent amounts of benomyl with concentrate sprayers.
FMAUSAH	Flyspeck (Schizothyrium)	2.0-3.0 oz/100 gal [200-500 gal/A] (50% WP) (75% FlC) or 0.375-0.5 tsp actual*/gal [1-2 gal/average sized tree] (50% WP)	Delayed dormant and foliar application. Apply at one-half inch green tip and repeat at 7 to 14 day intervals or as needed through cover sprays. If an application is missed during an infection period, apply the high rate as soon as possible after the infection period in order to deactivate scab and to prevent further infection.
FEAJVAG	Pear scab (Venturia)		
FFACPDJ	Powdery mildew (Podosphaera)		
FCAFGAL	Sooty blotch (Gloeodes)		
FIBFBAW	Fruit rot (Botrytis)	3.0 oz/100 gal (50% WP) (75% FlC) or 0.5 tsp actual*/gal (50% WP)	Foliar application. Apply once, anytime from 3 weeks before harvest up to day of harvest.
FIBFGAN	Fruit rot (Gloeosporium)		
FIBFPAO	Fruit rot (Penicillium)		
FGAVVAG	Overwintering scab (Venturia)	4.0 oz/100 gal (50% WP) (75% FlC) or 0.75 tsp actual*/gal (50% WP)	Foliar application after harvest. Apply thoroughly to foliage before leaf drop.
	Pear (postharvest)		See Apple (postharvest) cluster.

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	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/03008AA	Pecan		0.2 ppm (neglible residue) nuts Do not apply after shuck split through 0.5 pound per acre.
FMBCCBM FMASMCO FGAKQBB FMBDGAT FEAJCCV FFACMBT	Brown leaf spot (Cercospora) Downy leaf spot (Mycosphaerella) Fungal leaf scorch Liver spot (Gnomonia) Pecan scab (Cladosporium) Powdery mildew (Microsphaera)	0.25-0.5 lb/A (50% WP) (75% F1C) or 0.5 tsp actual*/gal [1-2 tsp oil/gal] or 0.625 tsp actual*/gal [max. 20 gal/tree] (50% WP)	Delayed dormant and foliar application. Apply the higher per acre rate on trees over 30 feet tall. For aircraft application in AR, LA, MS, OK, and TX, apply at high rate. Spray oil may be added (1 to 2 gallons per acre). Apply at prepollination when young leaves are unfolding, when small nuts are forming, and then at 3 to 4 week intervals. Do not apply more than 20 gallons of spray per tree using the tablespoon rate.
/06013AA	Pineapple (seed piece)	—	N.F.
FICVTAK	Butt rot (Thielaviopsis)	0.625 lb/100 gal water (50% WP) (75% F1C) or 2 tsp actual*/gal (50% WP)	Seed piece treatment. Apply as a preplant dip immersing seed pieces to give thorough wetting. Remove and allow to drain.
/06013EA	Pineapple (postharvest)		35 ppm (postharvest) Postharvest spray or dip through 2.0 pounds per 100 gallons. Do not immerse more than 5 minutes.
FI*FTAK	Thielaviopsis rot	1.0-2.0 lb/100 gal water (50% WP) (75% F1C) or 3-6 tsp actual*/gal (50% WP)	Postharvest treatment to fresh fruit. Immerse or spray fruit immediately after harvest. Allow to drain.
	Plum (preharvest)		See Apricot (preharvest) cluster.
	Plum (postharvest)		See Apricot (postharvest) cluster.

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	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Prune (preharvest)		See Apricot (preharvest) cluster.
	Prune (postharvest)		See Apricot (postharvest) cluster.
	Pumpkin		See Cucumber cluster.
	Raspberry		See Blackberry cluster.
/28072AA	Rice		5 ppm 15 ppm rice straw 20 ppm rice hulls 21 day preharvest interval through 1.0 pound per acre. Do not apply to stubble rice. Do not apply to fields where crayfish or catfish farming is practiced, nor drain water from treated areas into areas where such farming is practiced. Water drained from treated areas must not be used to irrigate other crops.
FMAHPCR	Blast (rotten neck) (Piricularia)	0.5-1.0 lb/A (50% WP) (75% FlC)	Use limited to areas other than CA. Foliar application. Apply at booting and repeat at heading.
FICHQBB	Stem rot		
/28023AA	Soybeans		0.2 ppm 35 day preharvest interval through 0.5 pound per acre. Do not graze or feed treated soybean vines or hay to livestock.
FAAAGAP	Anthracnose (Glomerella)	0.25-0.5 lb/A (50% WP) (75% FlC)	Foliar application. For determinate varieties (generally grown in the South), apply at early pod set when majority of pods are one-eighth to one-half inch long. For indeterminate varieties (generally grown in the North), apply when pods near the top of the plant are one-half to 1 inch in length. Make 1 additional application 14 to 21 days later.
FBAYDAP	Diaporthe pod and stem blight		
FMAVCBM	Frogeye leaf spot (Cercospora)		
FKACCBM	Purple seed stain (Cercospora)		
FMAJSBL	Septoria brown rot		

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	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/28023BA	Soybeans (seed crop)		0.2 ppm Single application through 1.0 pound per acre. Do not apply within 35 days of harvest. Do not graze or feed treated soybean vines or hay to livestock.
FBAYDAP	Diaporthe pod and stem blight	0.5-1.0 lb/A (50% WP)	Use limited to Midwest States. Foliar application. Make a single application when beans are developing in pods at 1 of the 4 uppermost nodes with a completely unrolled leaf.
/01016AA	Strawberry		5 ppm No preharvest interval through 0.5 pound per acre.
FAAACDP	Anthracnose (Colletotrichum)	0.5 lb/A (50% WP)-(75% FlC) or 1.0 oz/12.5 gal or 0.5 tsp actual*/gal (50% WP)	Delayed dormant and foliar application. Apply when plants are established in plant bed or field. Repeat at 7 day intervals.
FHACBAW	Gray mold (Botrytis)	0.25-0.5 lb/A (50% WP) (75% FlC) or 0.5-1.0 oz/12.5 gal or 0.25-0.5 tsp actual*/gal/200 sq.ft or 0.25-0.5 tbls actual*/gal (50% WP)	Foliar application. Apply the high rate at 10 percent bloom and at full bloom. Repeat at 10 to [illegible] day intervals using low rate.
[illegible]	Leaf blight (Dendrophoma)		
FGAKDBS	Leaf scorch (Diplocarpon)		
FMBCMCO	Leaf spot (Mycosphaerella)		
FFACSCO	Powdery mildew (Sphaerotheca)		

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	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/01016DA	Strawberry (transplants)		5 ppm
FIAXBAW FMBCMCO	Botrytis crown rot Leaf spot (Mycosphaerella)	0.25 lb/ 100 gal water (50% WP) (75% FlC) or 0.75 tsp actual*/gal (50% WP)	Dip treatment to transplants. Immerse plants to give thorough wetting. Remove and allow to drain.
/28020AA	Sugar Beets		0.2 ppm sugar beet roots 15 ppm sugar beet tops 21 day preharvest interval through 0.25 pound per acre.
FMBCCBM	Leaf spot (Cercospora)	0.188-0.25 lb/A (50% WP) (75% FlC)	Foliar application. Apply when disease first appears. Repeat at 14 to 21 day intervals as needed.
/25003AA	Sugarcane		N.F. Do not use treated seed cane for food or feed purposes.
FIBSCBI	Pineapple disease (Ceratocystis)	0.25 lb/100 gal water [300 ppm a.i.] or 0.125 lb/100 gal water [150 ppm a.i.] (50% WP) (75% FlC)	Use limited to HI. Seed cane treatment. Apply to cut seed cane as cold dip or hot dip. As a cold dip (300 ppm active ingredient), immerse seed cane to give thorough wetting. Remove and allow to drain. As a hot dip (150 ppm active ingredient), soak seed cane for 20 to 30 minutes at 122 F (50.0 C). Remove and allow to drain.
	Summer Squash		See Cucumber cluster.

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BENOMYL

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/11005AA	Tomato		5 ppm 50 ppm concentrated tomato products No preharvest interval through 0.5 pound per acre.
FHACBAW	Gray mold (Botrytis)	0.25-0.5 lb/A (50% WP) (75% FlC) or 0.5 oz/12.5 gal or 0.5-1 tbls actual*/2 gal or 0.25-0.5 tsp actual*/gal (50% WP)—	Foliar application. Apply when disease first appears. Repeat at 7 to 14 day intervals as needed.
FHAGCCV	Leaf mold (Cladosporium)		
FMBCCBM	Leaf spot (Cercospora)		
FMAEPBS	Phoma black spot of leaf		
FICHSAQ	Timber rot (Sclerotinia)		
	Winter Squash		See Cucumber cluster.
	TERRESTRIAL NON-FOOD CROP		
	(Ornamental Plants and Forest Trees)		
/34022AA	Azalea		
/34022CA			Addition of a surfactant to the spray mixture improves distribution of the spray on hard-to-wet plants.
/34058AA	Firethorn		
/34058CA			
/35056AA	Flowering Crabapple		
/35056CA			
/31126AA	Iris		
/31126CA			
/34088AA	Ligustrum		
/34088CA			
/31000AA	Ornamental Herbaceous Plants		
/31000CA			
/35000AA	Ornamental and/or Shade Trees		
/35000CA			
/34004AA	Ornamental Woody Shrubs		
/34004CA			
/34118AA	Rhododendron Hybrids/Cultivars		
/34118CA			

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Azalea cluster (continued)

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
FAAAQBB	Anthracnose	0.5 lb/ 100 gal or 0.25-0.5 lb/A (aircraft) (50% WP) (75% FlC) or 0.5 tbls actual*/gal (50% WP) or 0.75 tbls actual*/ 5 gal (75% FlC)	Foliar application. Apply when disease first appears and repeat at 10 to 14 day intervals throughout growing season. Shorten interval during humid, rainy weather. For Ovulinia petal blight, apply beginning as flowers open. For anthracnose on shade trees and woody ornamentals, apply at bud break and make 2 or 3 additional applications at 10 to 14 day intervals.
FBAAACC	Ascochyta blight		
FMBCCEM	Leaf spot (Cercospora)		
FMBCCEK	Leaf spot (Corynespora)		
FMBCDBD	Leaf spot (Didymellina) (of iris)		
FMBCEAW	Leaf spot (Entomosporium)		
FMBCRAD	Leaf spot (Ramularia)		
FMBCSBL	Leaf spot (Septoria)		
FBADOAV	Ovulinia petal blight (of azalea and rhododendron)	—	
FBAAPBU	Phomopsis blight		
FEAJFAM	Scab (Fusicladium) (of firethorn)		
FEAJVAG	Scab (Venturia) (of flowering crabapple)		
FHACBAW	Botrytis gray mold	0.25 lb/100 gal or 0.25-0.5 lb/A (50% WP) (75% FlC) or 0.04 oz/gal (50% WP) or 0.25 tbls actual*/gal (25%, 50% WP) or 0.75 tbls actual*/5 gal (75% FlC)	Foliar application. Apply when disease first appears and repeat at 10 to 14 day intervals throughout growing season. Shorten interval during humid, rainy weather.
FFACQBB	Powdery mildew		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Azalea cluster (continued)		
FICHBAW FICYBAW	Botrytis stem, crown and root rots	0.5 lb/ 100 gal or 1.0-2.0 oz/ 100 sq.ft (50% WP) (75% FlC) or 0.5 tbls actual*/gal (50% WP)	Foliar and soil application. Apply as a drench or heavy spray (1 to 2 pints of suspension per square foot) after transplanting into propagation beds or containers. Repeat at 2 to 4 week intervals during periods favorable for disease. Apply for stem, crown, and root rots on herbaceous annuals, perennials, and bedding plants; and for Cylindrocladium and Thielaviopsis rots on woody ornamentals such as azalea, rhododendrons, conifers, and poinsettias. [Benomyl does not control Pythium spp. or Phytophthora spp.]
FICHFAK FICYFAK	Fusarium stem, crown and root rots		
FICHRAM FICYRAM	Rhizoctonia stem, crown and root rots		
FICHSAQ FICYSAQ	Sclerotinia stem, crown and root rots		
FIAACFO	Cylindrocladium rot		
FIAATAK	Thielaviopsis rot		
		0.5 lb/ 100 gal (50% WP) (75% FlC) or 0.5 tbls actual*/gal (50% WP)	Preplant dip treatment. Immerse plants or cuttings for 10 to 15 minutes. Remove and allow to drain. Apply for diseases on the plants listed above.
/31083AA	Daffodil		
/31093AA	Easter Lily		
/31111AA	Gladiolus		
/31126AA	Iris		
/31025AA	Tulips		
FIAPFAK	Basal rot (Fusarium)	0.83 lb/ 100 gal (50% WP) (75% FlC) or 0.17 oz/gal or 0.83-1 tbls actual*/gal (50% WP) or 2.625 tbls actual*/4 gal (75% FlC)	Bulb and corm treatment. Soak cleaned bulbs or corms for 15 to 30 minutes in warm dip (80 to 85 F (26.7 to 29.4 C)) preferably within 48 hours after digging. Dry bulbs after treatment for storage. If bulbs are for forcing, treat after bulbs have been heat-cured.
FIAPPAO	Penicillium rot		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/35049AA	Elm		Use foliar spray or trunk injection treatment as in aid in the control of Dutch Elm Disease. For use by trained aborists in conjunction with sanitation and insect control programs. Best results are obtained if treatment is made on trees with no more than 5 percent crown damage.
FGAGCBI	Dutch Elm Disease (Ceratocystis ulmi)	4.0 lb/ 100 gal [concentrate sprayer or mist blower] or 1.0 lb/100 gal [hydraulic sprayer] (50% WP)	Foliar application. Apply 2 to 4 gallons of spray per mature tree with a concentrate sprayer or mist blower, or 10 to 20 gallons with hydraulic spray equipment. A suitable surfactant may be added. Apply in the spring when trees reach full leaf (the period when elm bark beetles usually begin feeding).
		1.0 lb/ 100 gal or 1.5 oz/3 gal (50% WP)	Trunk injection. Treatment may be made anytime during the growing season, preferably in the spring when trees reach full leaf. Repeat treatments may be made and are desirable if new infections occur. Gravity method. Use injector tubes equipped with cups of approximately 2 fluid ounces capacity. Insert injector tubes into outer growth rings just far enough so liquid will not leak at point of entry. Space at 2 inch intervals around the trunk. Fill cups and leave in place for 24 to 48 hours. Refill cups as needed. Remove injector tubes when treatment has been completed. Pressure method. Inject the suspension into the trunk of the tree with a pressure injection device at 20 to 30 pounds pressure per square inch. Inject approximately 1 gallon of suspension per each 10 inches of trunk diameter, the amount generally injectable in 0.5 hour for trees 10 inches or more in diameter. Use at least 1 injection site for each 10 inches of trunk circumference. For

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Elm (continued)		
			smaller trees, use the amount of material injectable in 0.5 hour.
/31147AA /31147CA	Orchids		Do not use inside living areas of dwellings. Spray out of doors. A suitable surfactant is recommended. Refer to manufacturer's literature for detailed descriptions and directions. On colored flowers, benomyl may leave a slight, noticeable residue.
FAAACDP	American anthracnose (Colletotrichum)	0.5 tbls actual*/gal (50% WP)	Foliar application. For anthracnose, apply when disease first appears and repeat in 7 days if needed. Cut off and destroy infected plant parts. For leaf spots, apply 3 times at 2 week intervals. Thereafter, spray once a month, if needed. For petal blight, apply monthly as a preventive. Where petal blight is severe, spray flowers just prior to opening and 7 days later.
FAAAGAP	European anthracnose (Gloeosporium)	—	
FMBCCBM	Leaf spot (Cercospora)		
FMBCPCE	Leaf spot (Phyllosticta)		
FBADBAW	Petal blight (Botrytis)		
FGATFAK FICBRAM	Fusarium wilt Rhizoctonia root rot	0.5 tbls actual*/gal (50% WP)	Dip or drench treatment. Dip for 5 minutes. Repeat in 2 weeks if needed.

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BENOMYL

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/33008AA	Ornamental Turf (athletic fields, commercial turf areas, golf courses, lawns, parks)		Do not graze or feed clippings from treated areas to livestock. When treating golf greens, always treat aprons and approaches. Apply wettable powder in sufficient water for thorough coverage, usually 2 to 5 gallons per 1,000 square feet. Unless specified otherwise for granular formulations, water after application. The 1.95 percent granular formulation includes fertilizer.
FBAHRAM FMAQSAQ	Brown patch (Rhizoctonia) Dollar spot (Sclerolinia)	0.5-1.0 oz/ 1,000 sq.ft (1.5%, 1.57%, 1.6% G) (50% WP) or 3-6 tbls actual*/ 1,000 sq.ft (25%, 50% WP)	Foliar application. Apply low rate for dollar spot, and high rate for brown patch. Wettable powder may be tank mixed at low rate with maneb (2.4 to 3.0 ounce a.i.) or chlorothalonil (1.5 to 3.0 ounce a.i.). Apply when disease first appears and continue at 10 to 14 day intervals as long as needed. When conditions are unusually favorable for the development of brown patch, reduce interval to 5 to 7 days.
		0.5-1.0 oz/ 1,000 sq.ft (1.1% G) (1.95% G)	Foliar application. Apply to either moist or dry foliage. As a preventive, apply low rate in late spring. Repeat at 2 or 3 week intervals. Shorten interval during conditions favorable to brown patch. As a curative, apply the 1.95 percent formulation at the high rate for dollar spot and at the low rate for brown patch. Apply the 1.1 percent formulation at the high rate as a curative for either disease.
FBAAFAK	Fusarium blight (Fusarium roseum and F. tricinctum)	2.5-4.1 oz/ 1,000 sq.ft (1.6% G) (50% WP) or 15-24 tbls actual*/ 1,000 sq.ft (50% WP)	Foliar application. Apply when disease first appears. Repeat 10 to 14 days later. Immediately after application, water sufficiently to thoroughly wet soil to a depth of 1 inch below any mat or thatch present.

BENOMYL

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Ornamental Turf (continued)		
FHAJFAK	Fusarium patch (snow mold) (Fusarium nivale)	1.0 oz/ 1,000 sq.ft (1.6% G) (25%, 50% WP) or 6 tbls actual*/ 1,000 sq.ft (50% WP)	Foliar application. Apply when disease first appears and continue at 10 to 14 day intervals as long as needed.
		1.0 oz 1,000 sq.ft (1.1% G) (1.95% G)	Foliar application. Apply to either moist or dry foliage. Apply when disease first appears. Repeat if needed.
FLAUUAL	Stripe smut (Ustilago)	3.0-3.13 oz/ 1,000 sq.ft (1.5%, 1.57%, 1.6% G) (50% WP) or 18 tbls actual*/1,000 sq.ft (50% WP)	Foliar application. Apply once in October or early spring before grass begins growth. Water turf sufficiently to carry formulation to base of plants.
/34120AA /34120CA	Rose		Addition of a surfactant to the spray mixture improves distribution of the spray.
FMAEDBS FFACSCO	Black spot (Diplocarpon) Powdery mildew (Sphaerotheca)	0.5 lb/100 gal or 0.25-0.5 lb/A (50% WP) (75% FlC) or 0.04 oz/gal (50% WP) or 0.25-1 tbls actual*/gal (25%, 50% WP) or	Foliar application. Apply when disease first appears and repeat at 10 to 14 day intervals throughout the growing season. Shorten intervals during humid, rainy weather.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Rose (continued)		
		1.5 tbls actual*/5 gal (75% FlC)	
		See Azalea cluster, Botrytis gray mold, for additional information.	
	GREENHOUSE FOOD CROP		
	(Agricultural Crops)		
/11005CA	Tomato (greenhouse)		5 ppm 50 ppm concentrated tomato products No preharvest interval through 0.5 pound per 100 gallons.
FHACBAW	Gray mold (Botrytis)	0.25-0.5 lb/100 gal (50% WP) (75% FlC) or 0.5-1.5 tsp actual*/gal (50% WP)	Foliar application to greenhouse grown plants. Apply when disease first appears. Repeat at 7 to 14 day intervals as needed.
FHAGCCV	Leaf mold (Cladosporium)		
FMBCCBM	Leaf spot (Cercospora)		
FMAEPBS	Phoma black spot of leaf		
FICHSAQ	Timber rot (Sclerotinia)		
	GREENHOUSE NON-FOOD CROP		
	(Ornamental Plants and Forest Trees)		
/34022CA	Azalea		
/34058CA	Firethorn		
/34056CA	Flowering Crabapple		
/31126CA	Iris		
/34088CA	Ligustrum		
/31000CA	Ornamental Herbaceous Plants		
/35000CA	Ornamental and/or Shade Trees		
/34004CA	Ornamental Woody Shrubs		
/34118CA	Rhododendron Hybrids/Cultivars		
		Refer to TERRESTRIAL NON-FOOD CROP, (Ornamental Plants and Forest Trees), Azalea cluster, for use and limitation information.	

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/34147CA	Orchids		Refer to TERRESTRIAL NON-FOOD CROP, (Ornamental Plants and Forest Trees), Orchids, for use and limitation information.
/34120CA	Rose		Refer to TERRESTRIAL NON-FOOD CROP, (Ornamental Plants and Forest Trees), Rose, for use and limitation information.

AERIAL AND TANK MIX APPLICATIONS

9001500
AAAAAAA
Aerial Application

—

Refer to
AGRICULTURAL CROPS

— Almond, Apricot, Avocado, Banana, Beans, Cabbage (seed crop), Carrots, Celery, Cherry, Cucumber, Grapes, Melons, Nectarine, Peach, Peanuts, Pecan, Plum, Prune, Pumpkin, Rice, Soybeans, Strawberry, Sugar Beets, Summer Squash, Winter Squash

ORNAMENTAL PLANTS
(Ornamental Plants and Forest Trees)

Azalea, Firethorn, Flowering Crabapple, Iris, Ligustrum, Ornamental Herbaçeous Plants, Ornamental and/or Shade Trees, Ornamental Woody Shrubs and Vines, Rhododendron Hybrids/Cultivars, Rose

9900300
AAAAAAA
Tank Mix

—

Refer to
AGRICULTURAL CROPS

Apple, Peanuts

ORNAMENTAL PLANTS
(Ornamental Turf (including ground covers))

Ornamental Turf

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BENOMYL

Listing of Registered Pesticide Products by Formulation

6095.0001 95% technical chemical
benomyl (099101)
000352-00377

6050.0002 50% formulation intermediate
benomyl (099101)
000352-00358

6001.1004 1.1% granular
benomyl (099101)
000538-00132

6001.5004 1.5% granular
benomyl (099101)
001159-00183

6001.5704 1.57% granular
benomyl (099101)
000572-00256

6001.6004 1.6% granular
benomyl (099101)
000004-00201 007401-00407

6001.9504 1.95% granular
benomyl (099101)
000538-00066

6000.0305 0.3% pelleted/tableted
benomyl (099101) plus 2-(2-ethoxyethoxy)ethyl 2-benzimidazole carbamate (115001)
007946-00006*
*[illegible] currently unavailable for review

6025.0006 25% wettable powder
benomyl (099101)
034911-00027

6050.0006 50% wettable powder
benomyl (099101)
000004-00196 000004-00215 000016-00131 000070-00263
000192-00127 000352-00354 000352-00357 000352-00385
000352-00434 000557-01930 000572-00254 000731-00036
000769-00419 000802-00490 000829-00217 000869-00125
000904-00224 001159-00184 001386-00571 002125-00064
002169-00223 005481-00138 005719-00074 005719-00075
005887-00129 007401-00225 007478-00048 007478-00049
007478-00050 008590-00498 042057-00092 043410-00022
045084-00023

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BENOMYL

Listing of Registered Pesticide Products by Formulation (continued)

6203.0014 3% (0.25% lb/gal) flowable concentrate
benomyl (099101)
008764-00017 046148-00002

6075.0014 75% flowable concentrate (dry)
benomyl (099101)
000352-00396

6210.0015 10% (0.72 lb/gal) soluble concentrate/liquid
benomyl (099101)
008764-00027

9999999 State Label Registrations

AZ Reg. No.
004581-04385

CA Reg. No.
000909-04701 002935-06587 002935-06641 004581-04391
008764-07255 008764-07452 010965-09918* 010965-09919*
010965-09920* 011093-07129 035296-05825
*jacket currently unavailable for review

FL Reg. No.
008517-03345 008517-03346 008517-03348 008764-07230
008764-09640 014775-10505 035222-07169

GA Reg. No.
004581-04401

HI Reg. No.
037843-08588

MD Reg. No.
004581-04400

NC Reg. No.
004581-04399

NJ Reg. No.
004581-04396

NY Reg. No.
038655-10456 038655-10469

OR Reg. No.
001871-08945

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BENOMYL

Listing of Registered Pesticide Products by Formulation (continued)

PA Reg. No.
004581-04398

SC Reg. No.
004581-04397

TX Reg. No.
000557-09608 000557-09609 000557-09610 000557-09611
000557-09612 000557-09613 000557-09614 000557-09615
000557-09616 000557-09617 000557-09618 000557-09619
000557-09620 000557-09621 000557-09622

VA Reg. No.
004581-04402

WA Reg. No.
004581-04393 007404-06536

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EPA Index to Pesticide Chemicals

BENOMYL

Appendix A

Listing of Common Chemical Names Used on the Entry

Chemical Code	Common Name (source)	EPA Acceptable Common/Chemical Name
014504	mancozeb (ISO)	zinc ion and manganese ethylene bisthiocarbamate 80%, a coordination product of manganese 16%, zinc 2%, ethylene bisthiocarbamate 62%

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BENOMYL

Appendix B

Listing by Site/Pest and Site/Formulation/Registration Number

TERRESTIAL FOOD CROP

/03001AA Almond
FBADMCB Brown rot blossom and twig blight (Monilinia)
(50% WP)
000070-00263 000352-00354

(75% FlC) (dry)
000352-00396

/04001AA Apple (preharvest/foliar post harvest)
FEAJVAG Apple scab (Venturia)
FMAUSAH Flyspeck (Schizothyrium)
FIBFBAW Fruit rot (Botrytis)
FIBFGAN Fruit rot (Gloeosporium)
FIBFPAO Fruit rot (Penicillium)
FGAVVAG Overwintering scab (Venturia)
FFACPDJ Powdery mildew (Podosphaera)
FCAFGAL Sooty blotch (Gloeodes)
(50% WP)
000070-00263 000352-00354 000572-00254 000802-00490
002169-00223 008590-00498 045084-00023

(75% FlC) (dry)
000352-00396

/04001EA Apple (postharvest)
FIBFBAW Fruit rot (Botrytis)
FIBFGAN Fruit rot (Gloeosporium)
FIBFPAO Fruit rot (Penicillium)
(50% WP)
000070-00263 000352-00354 002169-00223 043410-00022
045084-00023

(3% (0.25% lb/gal) FlC)
008764-00017

(75% FlC) (dry)
000352-00396

/05001EA Apricot (postharvest)
FICZQBB Postharvest fruit rots
(50% WP)
000070-00263 000352-00354 002169-00223 005481-00138
043410-00022 045084-00023

(3% (0.25% lb/gal) FlC)
008764-00017

	Apricot (postharvest) (continued)
	(75% FlC) (dry)
	000352-00396
/05001AA	**Apricot** (preharvest)
FBADMCB	Brown rot blossom and twig blight (Monilinia)
FIALMCB	Brown rot of fruit (Monilinia)
FEAJCCV	Peach scab (Cladosporium)
FFACQBB	Powdery mildew
	(50% WP)
	000352-00354 000572-00254 000802-00490 000869-00125
	002169-00223 005481-00138 008590-00498 045084-00023
	(75% FlC) (dry)
	000352-00396
/06001AA	**Avocado**
FAAAGAP	Anthracnose (Glomerella)
FMCBCBM	Cercospora leaf and fruit spot
FEAJSCB	Scab (spot anthracnose) (Sphaceloma)
	(50% WP)
	000070-00263 000352-00354
	(75% FlC) (dry)
	000352-00396
/06002AA	**Banana**
FMBOCBM	Sigatoka disease (Cercospora leaf spot)
	(50% WP)
	000070-00263 000352-00385
/06002EA	**Banana** (postharvest)
FIXAQBB	Crown rot
FIBFQBB	Surface molds
	(50% WP)
	000070-00263
/28001AA	**Beans**
FHACBAW	Gray mold (Botrytis)
FHANSAQ	White mold (Sclerotinia)
	(50% WP)
	000070-00263 000192-00127 000352-00354 000572-00254
	000731-00036 000802-00490 000904-00224 005719-00075
	042057-00092 045084-00023
	(75% FlC) (dry)
	000352-00396

EPA Index to Pesticide Chemicals

BENOMYL

Appendix B

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

/01002AA	Blackberry
FIBFBAW	Fruit rot (Botrytis)
FIBFPAO	Fruit rot (Penicillium)
FFACSCO	Powdery mildew (Sphaerotheca)
	(50% WP)
	000070-00263 000192-00127 000352-00354 042057-00092
	(75% FlC) (dry)
	000352-00396
/01009AA	Blueberry
FAAAGAN	Anthracnose (leaf spot) (Gloeosporium)
FBADBAW	Botrytis blossom blight
FIBMMCB	Mummy berry (Monilinia vacciniicorymbosi
	(50% WP)
	000070-00263 000352-00354
	(75% FlC) (dry)
	000352-00396
/01003AA	Boysenberry
FIBFBAW	Fruit rot (Botrytis)
FIBFPAO	Fruit rot (Penicillium)
FFACSCO	Powdery mildew (Sphaerotheca)
	(50% WP)
	000070-00263 000192-00127 000352-00354 042057-00092
	(75% FlC) (dry)
	000352-00396
/13007BA	Cabbage (seed crop)
FICXSAQ	Sclerotinia stalk rot
	(50% WP)
	000352-00354
	(75% FlC) (dry)
	000352-00396
/28073AA	Carrots
FHANSAQ	White rot (Sclerotinia)
	(50% WP)
	000352-00354
/13002AA	Celery
FBAMCBM	Early blight (Cercospora)
FBASSBL	Late blight (Septoria)
	(50% WP)
	000070-00263 000192-00127 000352-00354

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

Celery (continued)

(75% FlC) (dry)
000352-00396

/05002EA Cherry (postharvest)
FICZQBB Postharvest fruit rots
(50% WP)
000070-00263 000352-00354 002169-00223 005481-00138
043410-00022 045084-00023

(3% (0.25% lb/gal) FlC)
008764-00017

(75% FlC) (dry)
000352-00396

/05002AA Cherry (preharvest/foliar post harvest)
FBADMCB Brown rot blossom and twig blight (Monilinia)
FIALMCB Brown rot of fruit (Monilinia)
FMBCCDJ Cherry leaf spot (Coccomyces)
FEAJCCV Peach scab (Cladosporium)
FFACQBB Powdery mildew
(50% WP)
000352-00354 000572-00254 000802-00490 002169-00223
005481-00138 008590-00498 045084-00023

(75% FlC) (dry)
000352-00396

/02000AA Citrus Fruits
FIBFPAO Blue mold (Penicillium italicum)
FMAYMCO Greasy spot (Mycosphaerella)
FIBFPAO Green mold (Penicillium digitatum)
FAABEAH Scab (spot anthracnose) (Elsinoe)
FICIQBB Stem-end rot
(50% WP)
000070-00263 000192-00127 000352-00354

(75% FlC) (dry)
000352-00396

/02000EA Citrus Fruits (postharvest)
FIBFPAO Blue mold (Penicillium italicum)
FIBFPAO Green mold (Penicillium digitatum)
FICIQBB Stem-end rot
(50% WP)
000070-00263 000352-00354 043410-00022

Citrus Fruits (postharvest) (continued)

(3% (0.25% lb/gal) FlC)
008764-00017 046148-00002

(75% FlC) (dry)
000352-00396

(10% (0.72 lb/gal) SC/L)
008764-00027

/10010AA Cucumber
FAAACDP Anthracnose (Colletotrichum)
FBAQMCO Gummy stem blight (Mycosphaerella)
FFACEBJ Powdery mildew (Erysiphe)
FMBCCEK Target leaf spot (Corynespora) (on cucumbers)
(50% WP)
000070-00263 000192-00127 000352-00354 000352-00434
000572-00254 000731-00036 000869-00125 000904-00224
002169-00223 005481-00138 005719-00075 042057-00092
045084-00023

(75% FlC) (dry)
000352-00396

/01004AA Dewberry
FIBFBAW Fruit rot (Botrytis)
FIBFPAO Fruit rot (Penicillium)
FFACSCO Powdery mildew (Sphaerotheca)
(50% WP)
000070-00263 000352-00354 042057-00092

(75% FlC) (dry)
000352-00396

/01014AA Grapes
FIADMAV Bitter rot (Melanconium)
FIBFGBG Black rot (Guignardia)
FLARBAW Botrytis bunch rot
FFACUAB Powdery mildew (Uncinula)
(50% WP)
000070-00263 000352-00354 008590-00498

(75% FlC) (dry)
000352-00396

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

/01005AA **Loganberry**
FIBFBAW Fruit rot (Botrytis)
FIBFPAO Fruit rot (Penicillium)
FFACSCO Powdery mildew (Sphaerotheca)
(50% WP)
000070-00263 000352-00354 042057-00092

(75% FlC) (dry)
000352-00396

/03007AA **Macadamia Nut**
FBADBAW Botrytis blossom blight
(50% WP)
000070-00263 000352-00354

(75% FlC) (dry)
000352-00396

/06007AA **Mango**
FAAAGAP Anthracnose (flower and twig blight/fruit spot) (Glomerella)
(50% WP)
000070-00263 000352-00354

(75% FlC) (dry)
000352-00396

/10001AA **Melons**
FAAACDP Anthracnose (Colletotrichum)
FBAQMCO Gummy stem blight (Mycosphaerella)
FFACEBJ Powdery mildew (Erysiphe)
(50% WP)
000070-00263 000192-00127 000352-00354 000352-00385
000572-00254 000731-00036 000904-00224 002169-00223
005481-00138 005719-00075 042057-00092 045084-00023

(75% FlC) (dry)
000352-00396

/16003AA **Mushrooms**
FGAFVAK Verticillium spot (dry bubble)
(50% WP)
000070-00263 000352-00354

(75% FlC) (dry)
000352-00396

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BENOMYL

Appendix B

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

/05003EA Nectarine (postharvest)
FICZQBB Postharvest fruit rots
(50% WP)
000070-00263 000352-00354 002169-00223 005481-00138
043410-00022 045084-00023

(3% (0.25% lb/gal) FlC)
008764-00017

(75% FlC) (dry)
000352-00396

/05003AA Nectarine (preharvest)
FBADMCB Brown rot blossom and twig blight (Monilinia)
FIALMCB Brown rot of fruit (Monilinia)
FEAJCCV Peach scab (Cladosporium)
FFACQBB Powdery mildew
(50% WP)
000352-00354 000802-00490 000869-00125 002169-00223
005481-00138 008590-00498 045084-00023

(75% FlC) (dry)
000352-00396

/05004EA Peach (postharvest)
FICZQBB Postharvest fruit rots
(50% WP)
000070-00263 000352-00354 002169-00223 005481-00138
043410-00022 045084-00023

(3% (0.25% lb/gal) FlC)
008764-00017

(75% FlC) (dry)
000352-00396

/05004AA Peach (preharvest)
FBADMCB Brown rot blossom and twig blight (Monilinia)
FIALMCB Brown rot of fruit (Monilinia)
FEAJCCV Peach scab (Cladosporium)
FFACQBB Powdery mildew
(50% WP)
000352-00354 000572-00254 000802-00490 000869-00125
002169-00223 005481-00138 008590-00498 045084-00023

(75% FlC) (dry)
000352-00396

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

/280154AA	**Peanuts**
FMBCCBM	Leaf spot (Cercospora)
	(50% WP)
	000352-00354 002169-00223 045084-00023
	(75% FlC) (dry)
	000352-00396
/04003EA	**Pear** (postharvest)
FIBFBAW	Fruit rot (Botrytis)
FIBFGAN	Fruit rot (Gloeosporium)
FIBFPAO	Fruit rot (Penicillium)
	(50% WP)
	000070-00263 000352-00354 002169-00223 043410-00022 045084-00023
	(3% (0.25% lb/gal) FlC)
	008764-00017
	(75% FlC) (dry)
	000352-00396
/04003AA	**Pear** (preharvest/foliar postharvest)
FMAUSAH	Flyspeck (Schizothyrium)
FIBFBAW	Fruit rot (Botrytis)
FIBFGAN	Fruit rot (Gloeosporium)
FIBFPAO	Fruit rot (Penicillium)
FGAVVAG	Overwintering scab (Venturia)
FEAJVAG	Pear scab (Venturia)
FFACPDJ	Powdery mildew (Podosphaera)
[illegible]	Sooty blotch (Gloeodes)
	(50% WP)
	000070-00263 000192-00127 000352-00354 000572-00254 002169-00223 045084-00023
	(75% FlC) (dry)
	000352-00396
/03008AA	**Pecan**
FMBCCBM	Brown leaf spot (Cercospora)
FMASMCO	Downy leaf spot (Mycosphaerella)
FGAKQBB	Fungal leaf scorch
FMBDGAT	Liver spot (Gnomonia)
FEAJCCV	Pecan scab (Cladosporium)
FFACMBT	Powdery mildew (Microsphaera)
	(50% WP)
	000070-00263 000192-00127 000352-00354 002169-00223 045084-00023

Pecan (continued)

(75% FlC) (dry)
000352-00396

/06013AA Pineapple
FICVTAK Butt rot (Thielaviopsis)
(50% WP)
000070-00263 000352-00354

(75% FlC) (dry)
000352-00396

/06013EA Pineapple (postharvest)
FIBFTAK Thielaviopsis rot
(50% WP)
000070-00263 000352-00354

(75% FlC) (dry)
000352-00396

/05005EA Plum (postharvest)
FICZQBB Postharvest fruit rots
(50% WP)
000070-00263 000352-00354 002169-00223 005481-00138
043410-00022 045084-00023

(3% (0.25% lb/gal) FlC)
008764-00017

(75% FlC) (dry)
000352-00396

/05005AA Plum (preharvest)
FBADMCB Brown rot blossom and twig blight (Monilinia)
FIALMCB Brown rot of fruit (Monilinia)
FEAJCCV Peach scab (Cladosporium)
FFACQBB Powdery mildew
(50% WP)
000070-00263 000352-00354 000572-00254 000802-00490
000869-00125 002169-00223 005481-00138 008590-00498
045084-00023

(75% FlC) (dry)
000352-00396

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

/05006EA Prune (postharvest)
FICZQBB Postharvest fruit rots
(50% WP)
000070-00263 000352-00354 002169-00223 005481-00138
043410-00022 045084-00023

(3% (0.25% lb/gal) FlC)
008764-00017

(75% FlC) (dry)
000352-00396

/05006AA Prune (preharvest)
FBADMCB Brown rot blossom and twig blight (Monilinia)
FIALMCB Brown rot of fruit (Monilinia)
FEAJCCV Peach scab (Cladosporium)
FFACQBB Powdery mildew
(50% WP)
000070-00263 000352-00354 000802-00490 002169-00223
008590-00498

(75% FlC) (dry)
000352-00396

/10011AA Pumpkin
FAAACDP Anthracnose (Colletotrichum)
FBAQMCO Gummy stem blight (Mycosphaerella)
FFACEBJ Powdery mildew (Erysiphe)
(50% WP)
000070-00263 000192-00127 000352-00354 000572-00254
005719-00075

(75% FlC) (dry)
000352-00396

/0[illegible]0[illegible] A Raspberry
FIBFBAW Fruit rot (Botrytis)
FIBFPAO Fruit rot (Penicillium)
FFACSCO Powdery mildew (Sphaerotheca)
(50% WP)
000070-00263 000192-00127 000352-00354 042057-00092

(75% FlC) (dry)
000352-00396

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Appendix B

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

/28072AA	Rice			
FMAHPCR	Blast (rotten neck) (Piricularia)			
FICHQBB	Stem rot			
	(50% WP)			
	000352-00354			
	(75% FlC) (dry)			
	000352-00396			
/28023AA	Soybeans			
FAAAGAP	Anthracnose (Glomerella)			
FBAYDAP	Diaporthe pod and stem blight			
FMAVCBM	Frogeye leaf spot (Cercospora)			
FKACCBM	Purple seed stain (Cercospora)			
FMAJSBL	Septoria brown rot			
	(50% WP)			
	000352-00354			
	(75% FlC) (dry)			
	000352-00396			
/28023BA	Soybeans (seed crop)			
FBAYDAP	Diaporthe pod and stem blight			
	(50% WP)			
	000352-00354			
/01016AA	Strawberry			
FAAACDP	Anthracnose (Colletotrichum)			
FHACBAW	Gray mold (Botrytis)			
FBATDAH	Leaf blight (Dendrophoma)			
FGAKDBS	Leaf scorch (Diplocarpon)			
FMBCMCO	Leaf spot (Mycosphaerella)			
FFACSCO	Powdery mildew (Sphaerotheca)			
	(50% WP)			
	000070-00263	000192-00127	000352-00354	000802-00490
	0[illegible]69-00223	008590-00498	042057-00092	045084-00023
	(75% FlC) (dry)			
	000352-00396			
/01016DA	Strawberry (transplants)			
FIAXBAW	Botrytis crown rot			
FMBCMCO	Leaf spot (Mycosphaerella)			
	(50% WP)			
	000070-00263	000352-00354		
	(75% FlC) (dry)			
	000352-00396			

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BENOMYL

Appendix B

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

/28020AA Sugar Beets
FMBCCBM Leaf spot (Cercospora)
(50% WP)
000352-00354

(75% FlC) (dry)
000352-00396

/25003AA Sugarcane
FIBSCBI Pineapple disease (Ceratocystis)
(50% WP)
000352-00354

(75% FlC) (dry)
000352-00396

/10013AA Summer Squash
FAAACDP Anthracnose (Colletotrichum)
FBAQMCO Gummy stem blight (Mycosphaerella)
FFACEBJ Powdery mildew (Erysiphe)
(50% WP)
000070-00263 000192-00127 000352-00354 000572-00254
000731-00036 000869-00125 000904-00224 002169-00223
005481-00138 005719-00075 042057-00092 045084-00023

(75% FlC) (dry)
000352-00396

/11005AA Tomato
FHACBAW Gray mold (Botrytis)
FHAGCCV Leaf mold (Cladosporium)
FMBCCBM Leaf spot (Cercospora)
FMAEPBS Phoma black spot of leaf
FICHSAQ Timber rot (Sclerotinia)
(50% WP)
000070-00263 000192-00127 000352-00354 000572-00254
000869-00125 002169-00223 005719-00075 042057-00092
045084-00023

(75% FlC) (dry)
000352-00396

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

/10014AA Winter Squash
FAAACDP Anthracnose (Colletotrichum)
FBAQMCO Gummy stem blight (Mycosphaerella)
FFACEBJ Powdery mildew (Erysiphe)
(50% WP)
000070-00263 000192-00127 000352-00354 000572-00254
000731-00036 000869-00125 000904-00224 002169-00223
005481-00138 005719-00075 042057-00092 045084-00023

(75% FlC) (dry)
000352-00396

TERRESTIAL NON-FOOD CROP

(Ornamental Plants and Forest Trees)

/34022AA Azalea
FBADOAV Ovulinia petal blight (of azalea and rhododendron)
(50% WP)
000004-00196 000016-00131 000070-00263 000192-00127
000352-00354 000352-00357 005481-00138 005719-00074
005719-00075 008590-00498

(75% FlC) (dry)
000352-00396

/31083AA Daffodil
FIAPFAK Basal rot (Fusarium)
FIAPPAO Penicillium rot
(50% WP)
000004-00196 000016-00131 000070-00263 000352-00354
000352-00357 000731-00036 000802-00490 000829-00217
000904-00224 005481-00138 005887-00129 008590-00498
043410-00022

(75% FlC) (dry)
000352-00396

/31093AA Easter Lily
FIAPFAK Basal rot (Fusarium)
FIAPPAO Penicillium rot
(50% WP)
000004-00196 000016-00131 000070-00263 000352-00354
000352-00357 000731-00036 000802-00490 000829-00217
000904-00224 005481-00138 005887-00129 008590-00498
043410-00022

Easter Lily (continued)

(75% FlC) (dry)
000352-00396

/35049AA **Elm**
FGAGCBI Dutch Elm Disease (Ceratocystis ulmi)
(50% WP)
000004-00215 000352-00354

/34058AA **Firethorn**
FEAJFAM Scab (Fusicladium) (of firethorn)
(50% WP)
000004-00196 000016-00131 000070-00263 000192-00127
000352-00354 000352-00357 005481-00138 005719-00074
005719-00075 008590-00498

(75% FlC) (dry)
000352-00396

/35056AA **Flowering Crabapple**
FEAJVAG Scab (Venturia) (of flowering crabapple)
(50% WP)
000004-00196 000016-00131 000070-00263 000192-00127
000352-00354 000352-00357 005481-00138 005719-00074
005719-00075 008590-00498

(75% FlC) (dry)
000352-00396

/31111AA **Gladiolus**
FIAPFAK Basal rot (Fusarium)
FIAPPAO Penicillium rot
(50% WP)
000004-00196 000016-00131 000070-00263 000352-00354
000352-00357 000731-00036 000802-00490 000829-00217
000904-00224 005481-00138 005887-00129 008590-00498
043410-00022

(75% FlC) (dry)
000352-00396

/31126AA **Iris**
FIAPFAK Basal rot (Fusarium)
FIAPPAO Penicillium rot
FMBCDBD Leaf spot (Didymellina) (of iris)
(50% WP)
000004-00196 000016-00131 000070-00263 000192-00127
000352-00354 000352-00357 000731-00036 000802-00490
000829-00217 000904-00224 005481-00138 005719-00074
005719-00075 005887-00129 008590-00498 043410-00022

(75% FlC) (dry)
000352-00396

/34088AA **Ligustrum**
FMBCCEK Leaf spot (Corynespora)
(50% WP)
000004-00196 000016-00131 000070-00263 000192-00127
000352-00354 000352-00357 005481-00138 005719-00074
005719-00075

(75% FlC) (dry)
000352-00396

/31147AA **Orchids**
FAAACDP American anthracnose (Colletotrichum)
FAAAGAP European anthracnose (Gloeosporium)
FGATFAK Fusarium wilt
FMBCCBM Leaf spot (Cercospora)
FMBCPCE Leaf spot (Phyllosticta)
FBADBAW Petal blight (Botrytis)
FICBRAM Rhizoctonia root rot
(50% WP)
007478-00048

BENOMYL

Appendix B

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

/31000AA	Ornamental Herbaceous Plants
FBAAACC	Ascochyta blight
FHACBAW	Botrytis gray mold
FICHBAW	Botrytis stem, crown and root rots
FICYBAW	
FICHFAK	Fusarium stem, crown and root rots
FICYFAK	
FMBCCBM	Leaf spot (Cercospora)
FMBCRAD	Leaf spot (Ramularia)
FMBCSBL	Leaf spot (Septoria)
FFACQBB	Powdery mildew
FICHRAM	Rhizoctonia stem, crown and root rots
FICYRAM	
FICHSAQ	Sclerotinia stem, crown and root rots
FICYSAQ	

(25% WP)
034911-00027

(50% WP)

000004-00196	000016-00131	000070-00263	000192-00127
000352-00354	000352-00357	000557-01930	000572-00254
000731-00036	000769-00419	000802-00490	000829-00217
000904-00224	001159-00184	001386-00571	002125-00064
005481-00138	005719-00074	005719-00075	005887-00129
007401-00225	008590-00498	042057-00092	045084-00023

(75% FlC) (dry)
000352-00396

/35000AA	Ornamental and/or Shade Trees
FAAAQBB	Anthracnose
FIAACFO	Cylindrocladium rot
FMBCCBM	Leaf spot (Cercospora)
FMBCEAW	Leaf spot (Entomosporium)
FMBCSBL	Leaf spot (Septoria)
FBAAPBU	Phomopsis blight
FIAATAK	Thielaviopsis rot

(50% WP)

000004-00196	000016-00131	000070-00263	000192-00127
000352-00354	000352-00357	005481-00138	005719-00074
005719-00075	008590-00498		

(75% FlC) (dry)
000352-00396

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Appendix B

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

/33008AA	Ornamental Turf
FBAHRAM	Brown patch (Rhizoctonia)
FMAQSAQ	Dollar spot (Sclerolinia)
FBAAFAK	Fusarium blight (Fusarium roseum and F. tricinctum)
FHAJFAK	Fusarium patch (snow mold) (Fusarium nivale)
FLAUUAL	Stripe smut (Ustilago)

(1.1% G)
000538-00132

(1.5% G)
001159-00183

(1.57% G)
000572-00256

(1.6% G)
000004-00201 007401-00407

(1.95% G)
000538-00066

(25% WP)
034911-00027

(50% WP)
000004-00196 000004-00215 000016-00131 000070-00263
000192-00127 000352-00357 000557-01930 000572-00254
000731-00036 000769-00419 000802-00490 000829-00217
000869-00125 000904-00224 001159-00184 001386-00571
002125-00064 005719-00075 007401-00225 007478-00050
008590-00498 042057-00092 045084-00023

/34004AA	Ornamental Woody Shrubs
FAAAQBB	Anthracnose
FHACBAW	Botrytis gray mold
FIAACFO	Cylindrocladium rot
FMBCCBM	Leaf spot (Cercospora)
FMBCEAW	Leaf spot (Entomosporium)
FBAAPBU	Phomopsis blight
FFACQBB	Powdery mildew
FIAATAK	Thielaviopsis rot

(25% WP)
034911-00027

(50% WP)
000004-00196 000016-00131 000070-00263 000192-00127
000352-00354 000352-00357 000557-01930 000572-00254
000731-00036 000769-00419 000802-00490 000829-00217
000904-00224 001159-00184 001386-00571 002125-00064
005481-00138 005719-00074 005719-00075 005887-00129
007401-00225 008590-00498 042057-00092 045084-00023

(75% FlC) (dry)
000352-00396

/34118AA	Rhododendron Hybrids/Cultivars
FBADOAV	Ovulinia petal blight (of azalea and rhododendron)

(50% WP)
000004-00196 000016-00131 000070-00263 000192-00127
000352-00354 000352-00357 005481-00138 005719-00074
005719-00075 008590-00498

(75% FlC) (dry)
000352-00396

/34120AA	Rose
FMAEDBS	Black spot (Diplocarpon)
FFACSCO	Powdery mildew (Sphaerotheca)

(25% WP)
034911-00027

(50% WP)
000004-00196 000016-00131 000070-00263 000192-00127
000352-00354 000352-00357 000557-01930 000572-00254
000731-00036 000769-00419 000802-00490 000829-00217
000869-00125 000904-00224 001159-00184 001386-00571
002125-00064 005481-00138 005719-00074 005719-00075
005887-00129 007401-00225 007478-00049 008590-00498
042057-00092 045084-00023

Rose (continued)

(75% FlC) (dry)
000352-00396

/31025AA Tulips
FLAPFAK Basal rot (Fusarium)
FLAPPAO Penicillium rot
(50% WP)
000004-00196 000016-00131 000070-00263 000352-00354
000352-00357 000731-00036 000802-00490 000829-00217
000904-00224 005481-00138 005887-00129 008590-00498
043410-00022

(75% FlC) (dry)
000352-00396

GREENHOUSE FOOD CROP

(Agricultural Crops)

/11005CA Tomato (greenhouse)
FHACBAW Gray mold (Botrytis)
FHAGCCV Leaf mold (Cladosporium)
FMBCCBM Leaf spot (Cercospora)
FMAEPBS Phoma black spot of leaf
FICHSAQ Timber rot (Sclerotinia)
(50% WP)
000070-00263 000352-00354 000572-00254 005719-00075

(75% FlC) (dry)
000352-00396

GREENHOUSE NON-FOOD CROP

(Ornamental Plants and Forest Trees)

/34022CA Azalea
FBADOAV Ovulinia petal blight (of azalea and rhododendron)
(50% WP)
000004-00196 000016-00131 000070-00263 000352-00354
000352-00357 005719-00074 005719-00075 008590-00498

(75% FlC) (dry)
000352-00396

/34058CA **Firethorn**
FEAJFAM Scab (Fusicladium) (of firethorn)
(50% WP)
000004-00196 000016-00131 000070-00263 000352-00354
000352-00357 005719-00074 005719-00075 008590-00498

(75% FlC) (dry)
000352-00396

/35056CA **Flowering Crabapple**
FEAJVAG Scab (Venturia) (of flowering crabapple)
(50% WP)
000004-00196 000016-00131 000070-00263 000352-00354
000352-00357 005719-00074 005719-00075 008590-00498

(75% FlC) (dry)
000352-00396

/31126CA **Iris**
FMBCDBD Leaf spot (Didymellina) (of iris)
(50% WP)
000004-00196 000016-00131 000070-00263 000352-00354
000352-00357 005719-00074 005719-00075

(75% FlC) (dry)
000352-00396

/34088CA **Ligustrum**
FMBCCEK Leaf spot (Corynespora)
(50% WP)
000004-00196 000016-00131 000070-00263 000352-00354
000352-00357 005719-00074 005719-00075

(75% FlC) (dry)
000352-00396

/31147CA **Orchids**
FAAACDP American anthracnose (Colletotrichum)
FAAAGAP European anthracnose (Gloeosporium)
FGATFAK Fusarium wilt
FMBCCBM Leaf spot (Cercospora)
FMBCPCE Leaf spot (Phyllosticta)
FBADBAW Petal blight (Botrytis)
FICBRAM Rhizoctonia root rot
(50% WP)
007478-00048

Listing by Site/Pest and Site/Formulation/Registration Number (continued)

/31000CA	Ornamental Herbaceous Plants
FBAAACC	Ascochyta blight
FHACBAW	Botrytis gray mold
FICHBAW FICYBAW	Botrytis stem, crown and root rots
FICHFAK FICYFAK	Fusarium stem, crown and root rots
FMBCCBM	Leaf spot (Cercospora)
FMBCRAD	Leaf spot (Ramularia)
FMBCSBL	Leaf spot (Septoria)
FFACQBB	Powdery mildew
FICHRAM FICYRAM	Rhizoctonia stem, crown and root rots
FICHSAQ FICYSAQ	Sclerotinia stem, crown and root rots

(25% WP)
034911-00027

(50% WP)
000004-00196 000016-00131 000070-00263 000352-00354
000352-00357 000557-01930 000572-00254 000731-00036
000904-00224 001159-00184 001386-00571 002125-00064
005719-00074 005719-00075 005887-00129 007401-00225
008590-00498 045084-00023

(75% FlC) (dry)
000352-00396

/35000CA	Ornamental and/or Shade Trees
FAAAQBB	Anthracnose
FIAACFO	Cylindrocladium rot
FMBCCBM	Leaf spot (Cercospora)
FMBCEAW	Leaf spot (Entomosporium)
FMBCSBL	Leaf spot (Septoria)
FBAAPBU	Phomopsis blight
FIAATAK	Thielaviopsis rot

(50% WP)
000004-00196 000016-00131 000070-00263 000352-00354
000352-00357 005719-00074 005719-00075 008590-00498

(75% FlC) (dry)
000352-00396

/34004CA Ornamental Woody Shrubs
FAAAQBB Anthracnose
FHACBAW Botrytis gray mold
FLAACFO Cylindrocladium rot
FMBCCBM Leaf spot (Cercospora)
FMBCEAW Leaf spot (Entomosporium)
FBAAPBU Phomopsis blight
FFACQBB Powdery mildew
FLAATAK Thielaviopsis rot

(25% WP)
034911-00027

(50% WP)
000004-00196 000016-00131 000070-00263 000352-00354
000352-00357 000557-01930 000572-00254 000731-00036
000904-00224 001159-00184 001386-00571 002125-00064
005719-00074 005719-00075 005887-00129 007401-00225
008590-00498 045084-00023

(75% FlC) (dry)
000352-00396

/34118CA Rhododendron Hybrids/Cultivars
FBADOAV Ovulinia petal blight (of azalea and rhododendron)

(50% WP)
000004-00196 000016-00131 000070-00263 000352-00354
000352-00357 005719-00074 005719-00075 008590-00498

(75% FlC) (dry)
000352-00396

/34120AA Rose
FMAEDBS Black spot (Diplocarpon)
FFACSCO Powdery mildew (Sphaerotheca)

(25% WP)
034911-00027

(50% WP)
000004-00196 000016-00131 000070-00263 000352-00354
000352-00357 000557-01930 000572-00254 000731-00036
000869-00125 000904-00224 001159-00184 001386-00571
002125-00064 005719-00074 005719-00075 005887-00129
007401-00225 008590-00498 045084-00023

(75% FlC) (dry)
000352-00396

Benomyl (099101) October, 1984

CFR 40 sec. 180.294
CFR 21 sec. 193.3
CFR 21 sec. 561.50

The tolerance for avocado ~~appears to have been~~ was changed from 1 ppm (in Compendium and old CFR40) to 3 ppm in current sources. and The pre-harvest interval Changed from 30 14 days.

The tolerance for corn, fresh (inc. sweet K+CWHR) shows up in some tolerance sources but not others.

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Please see the allergic skin reaction notice on 352-434. It occurs only on this label (3/9/84 stamp).

Please also note the variation between labels concerning equivalent large and small dilutions:

352-254 (50% WP) - 1 lb 50%/100 gal = 1 tbls 50%/gal

70-263 (50% WP) - 1 lb 50%/100 gal = 2 level tsp 50%/gal

352-354 (75% dry flc) - 1 lb 75%/100 gal = 3 tbls 75%/5 gal

The effect of this is most noticeable between some of the teaspoon rates on 70-263 and the /100 gal rates on 352-254 that should be similar.

IV. BIBLIOGRAPHY APPENDICES

Guide to Bibliography

Bibliography

Appendix II-1

Guide to Use of This Bibliography

1. CONTENT OF BIBLIOGRAPHY. This bibliography contains citations of all studies considered relevant by EPA in arriving at the positions and conclusions stated elsewhere in the Standard. Primary sources for studies in this bibliography have been the body of data submitted to EPA and its predecessor agencies in support of past regulatory decisions. Selections from other sources including the published literature, in those instances where they have been considered, will be included.

2. UNITS OF ENTRY. The unit of entry in this bibliography is called a "study." In the case of published materials, this corresponds closely to an article. In the case of unpublished materials submitted to the Agency, the Agency has sought to identify documents at a level parallel to the published article from within the typically larger volumes in which they were submitted. The resulting "studies" generally have a distinct title (or at least a single subject), can stand alone for purposes of review, and can be described with a conventional bibliographic citation. The Agency has attempted also to unite basic documents and commentaries upon them, treating them as a single study.

3. IDENTIFICATION OF ENTRIES. The entries in this bibliography are sorted numerically by "Master Record Identifier," or MRID, number. This number is unique to the citation, and should be used at any time specific reference is required. It is not related to the six-digit "Accession Number" which has been used to identify volumes of submitted studies; see paragraph 4(d)(4) below for a further explanation. In a few cases, entries added to the bibliography late in the review may be preceded by a nine-character temporary identifier. These entries are listed after all MRID entries. This temporary identifier number is also to be used whenever specific reference is needed.

4. FORM OF ENTRY. In addition to the Master Record Identifier (MRID), each entry consists of a citation containing standard elements followed, in the case of material submitted to EPA, by a description of the earliest known submission. Bibliographic conventions used reflect the standards of the American National Standards Institute (ANSI), expanded to provide for certain special needs.

a. Author. Whenever the Agency could confidently identify one, the Agency has chosen to show a personal author. When no individual was identified, the Agency has shown an identifiable laboratory or testing facility as author. As a last resort, the Agency has shown the first submitter as author.

b. Document Date. When the date appears as four digits with no question marks, the Agency took it directly from the document. When a four-digit date is followed by a question mark, the bibliographer deduced the date from evidence in the document. When the date appears as (19??), the Agency was unable to determine or estimate the date of the document.

c. Title. In some cases, it has been necessary for Agency bibliographers to create or enhance a document title. Any such editorial insertions are contained between square brackets.

d. Trailing Parentheses. For studies submitted to the Agency in the past, the trailing parentheses include (in addition to any self-explanatory text) the following elements describing the earliest known submission:

   (1) Submission Date. The date of the earliest known submission appears immediately following the word "received."

   (2) Administrative Number. The next element, immediately following the word "under," is the registration number, experimental use permit number, petition number, or other administrative number associated with the earliest known submission.

   (3) Submitter. The third element is the submitter, following the phrase "submitted by." When authorship is defaulted to the submitter, this element is omitted.

   (4) Volume Identification (Accession Numbers). The final element in the trailing parentheses identifies the EPA accession number of the volume in which the original submission of the study appears. The six-digit accession number follows the symbol "CDL," standing for "Company Data Library." This accession number is in turn followed by an alphabetic suffix which shows the relative position of the study within the volume. For example, within accession number 123456, the first study would be 123456-A; the second, 123456-B; the 26th, 123456-Z; and the 27th, 123456-AA.

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REGISTRATION STANDARD BIBLIOGRAPHY
Citations Considered to be Part of the Data Base Supporting Registrations Under the Benomyl Standard

MRID	CITATION
00003806	E.I. du Pont de Nemours & Company (1973) Data Supporting the Use of Benlate(R) Benomyl Fungicide on Cucurbits. (Unpublished study received Jul 20, 1973 under 352-354; CDL:008909-A)
00026042	Cauer, W.O.; Haglund, W.A.; Archer, T.E. (1978) Summary of Residue Data for Benomyl in or on Spinach: PR No. 761. (Unpublished study received Dec 19, 1979 under 0E2309; prepared in cooperation with Washington State Univ., Northwestern Washington Research and Extension Unit, Dept. of Plant Pathology and Univ. of California, Dept. of Environmental Toxicology, submitted by Interregional Research Project No. 4, New Brunswick, N.J.; CDL:099156-A)
00030771	Hopkins, D.L.; Fennell, J.J.; Amador, J.M.; et al. (1975) Data Supporting the Use of Benlate(R) Benomyl Fungicide plus Manzate(R) 200 or Manzate(R) D as Tank Mixtures for the Control of Certain Diseases of Cucurbits. (Unpublished study including published data, received Jun 12, 1975 under 352-291; prepared in cooperation with Univ. of Florida, Agricultural Research Center at Leesburg and others, submitted by E.I. du Pont de Nemours & Co., Wilmington, Del.; CDL:241809-A)
00035346	E.I. du Pont de Nemours & Company, Incorporated (1970) Results of Tests on the Amount of Residue Remaining on Treated Crops: Benomyl. (Unpublished study received Jul 1, 1970 under 1F1010; CDL:091750-A)
00035358	E.I. du Pont de Nemours & Company, Incorporated (19??) Benomyl: Livestock Feeding Study--Milk and Meat. (Unpublished study received Jul 1, 1970 under 1F1010; CDL:091750-N)
00035359	Kirkland, J.J.; Pease, H.L. (19??) Residue Data--Benomyl Livestock Feeding Study. (Unpublished study received Jul 1, 1970 under 1F1010; submitted by E.I. du Pont de Nemours & Co., Inc., Wilmington, Del.; CDL:091750-O)
00035360	Kirkland, J.J. (1969) Determination of Residues of Benomyl and/or Metabolites in Cow Milk, Tissues, Urine and Feces. Undated method. (Unpublished study received Jul 1, 1970 under 1F1010; submitted by E.I. du Pont de Nemours & Co., Inc.; CDL: Wilmington, Del.; CDL:091750-P)
00035361	Kirkland, J.J.; Reiser, R.U.; Wayne, W.J.; et al. (1969) Study of Metabolites of Benomyl in Animal Feeding Tests. (Unpublished study received Jul 1, 1970 under 1F1010; submitted by E.I. du Pont de Nemours & Co., Inc., Wilmington, Del.; CDL:091750-Q)

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00035615	E.I. du Pont de Nemours & Company, Incorporated (1971) Results of Tests on the Amount of Residue Remaining on Treated Crops: Benomyl. (Unpublished study received Aug 3, 1973 under 4F1427; CDL:093803-C)
00037182	E.I. du Pont de Nemours & Company, Incorporated (1969?) Results of Tests on the Amount of Residue Remaining on Treated Crops: Benomyl. (Unpublished study received Jan 23, 1970 under 0G0936; CDL:091599-A)
00037185	Baude, F.J. (1964?) Examination of C14-Residues on Glass and Oranges Treated with Methyl 1-(butylcarbamoyl)-2-C14-benzimidazolecarbamate. (Unpublished study received Jan 23, 1970 under 0G0936; submitted by E.I. du Pont de Nemours & Co., Inc., Wilmington, Del.; CDL:091599-D)
00037186	Gardiner, J.A. (1964?) Metabolism of Methyl-1-(butylcarbamoyl)-2-C14-benzimidazolecarbamate in Apple Leaves. (Unpublished study received Jan 23, 1970 under 0G0936; submitted by E.I. du Pont de Nemours & Co., Inc., Wilmington, Del.; CDL:091599-E)
00037187	Baude, F.J. (1964?) Metabolism of Methyl 1-(butylcarbamoyl)-2-C14-benzimidazole in Orange Leaves. (Unpublished study received Jan 23, 1970 under 0G0936; submitted by E.I. du Pont de Nemours & Co., Inc., Wilmington, Del.; CDL:091599-F)
00037188	Gardiner, J.A. (1964?) Metabolism of Methyl 1-(butylcarbamoyl)-2-C14-benzimidazolecarbamate in Cucumber Seedlings. (Unpublished study received Jan 23, 1970 under 0G0936; submitted by E.I. du Pont de Nemours & Co., Inc.; Wilmington, Del.; CDL:091599-G)
00037189	Gardiner, J.A. (1964?) Metabolism of Methyl 1-(butylcarbamoyl)-2-C14-benzimidazolecarbamate in Bean Seedlings. (Unpublished study received Jan 23, 1970 under 0G0936; submitted by E.I. du Pont de Nemours & Co., Inc., Wilmington, Del.; CDL:091599-H)
00037196	Peterson, C.A.; Edgington, L.V. (1969) Quantitative estimation of the fungicide Benomyl using a bioautograph technique. Journal of Agricultural and Food Chemistry 17(4):898-899. (Also in unpublished submission received Jan 23, 1970 under 0G0936; submitted by E.I. du Pont de Nemours & Co., Inc., Wilmington, Del.; CDL:091599-O)
00037360	Han, J.C. (19??) Residues on Plant Foliage Sprayed with Benomyl in the Presence of Alkaline Pesticides. (Unpublished study received Sep 16, 1971 under 1F1033; submitted by E.I. du Pont de Nemours & Co., Inc., Wilmington, Del.; CDL:091918-A)

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00037362	Morales, R. (19??) Residues in Freshly Limed Soil following Application of Benlate(R) Benomyl Fungicide. (Unpublished study received Sep 16, 1971 under 1F1033; submitted by E.I. du Pont de Nemours & Co., Inc., Wilmington, Del.; CDL:091918-C)
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00037364	E.I. du Pont de Nemours & Company, Incorporated (19??) Crop Residue Data--STB. (Unpublished study received Sep 16, 1971 under 1F1033; CDL:091918-E)
00037365	Pease, H.L.; Gardiner, J.A. (1970) Results of Tests on the Amount of Residue Remaining on Treated Crops: Benomyl. (Unpublished study including published data, received Sep 16, 1971 under 1F1033; submitted by E.I. du Pont de Nemours & Co., Inc., Wilmington, Del.; CDL:091918-F)
00038451	Baude, F.J. (1964?) Stability of Benomyl on Apple, Banana, Cucumber, Grape, and Orange Leaves under Outdoor Exposure Conditions. (Unpublished study received Sep 16, 1971 under 1F1033; submitted by E.I. du Pont de Nemours & Co., Inc., Wilmington, Del.; CDL: 091918-G)
00038808	Fitzpatrick, K. (1980) Chinese Hamster Ovary Cell Assay for Mutagenicity: Haskell Laboratory Report No. 438-80. (Unpublished study including letter dated Jun 16, 1980 from J.A. Gardiner to Esther Saito, received Jun 17, 1980 under 352-354; submitted by E.I. du Pont de Nemours & Co., Wilmington, Del.; CDL:242834-A)
00040272	E.I. du Pont de Nemours & Company, Incorporated (1971) Results of Tests on the Amount of Residue Remaining on Treated Crops: Benomyl. (Unpublished study received Sep 1, 1971 under 2G1197; CDL:095931-B)

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00044906	Interregional Research Project Number 4 (1969) Outline of Procedure Used for Analysis of Red Beets for Benomyl Residue. Undated method. (Unpublished study received Sep 4, 1980 under 0E2409; CDL:099579-B)
00046244	Springer, J.K.; Johnston, S.A.; Ercegovich, C.D. (1980) Residue Studies--Eggplants, Peppers. (Unpublished study received May 15, 1980 under 352-354; prepared in cooperation with Rutgers, the State Univ. of New Jersey, Research and Development Center, Cooperative Extension Service and Pennsylvania State Univ., Pesticide Residue Laboratory, submitted by E.I. du Pont de Nemours & Co., Wilmington, Del.; CDL:099432-A)
00046245	Pennsylvania State University, Pesticide Research Laboratory and Graduate Study Center (1977) Outline of Procedure Used for Analysis of Eggplant for Benomyl Residue. Undated method. (Unpublished study received May 15, 1980 under 352-354; submitted by E.I. du Pont de Nemours & Co., Wilmington, Del.; CDL:099432-B)
00046819	Pennsylvania State University, Pesticide Research Laboratory and Graduate Study Center (1977) Outline of Procedure Used for Analysis of Pepper for Benomyl Residue. Undated Method. (Unpublished study received May 15, 1980 under 352-354; submitted by E.I. du Pont de Nemours & Co., Wilmington, Del.; CDL:099432-C)
00048098	Hunter, J.E.; Conway, K.E.; Spittler, T.D.; et al. (1980) Summary of Residue Chemistry Data. (Unpublished study received Sep 4, 1980 under 0E2409; prepared in cooperation with Cornell Univ., New York State Agricultural Experiment Station, Dept. of Plant Pathology and others, submitted by Interregional Research Project No. 4, New Brunswick, N.J.; CDL:099579-A)
00048099	Pease, H.L.; Gardiner, J.A. (1969) Fluorometric and colorimetric procedures for determining residues of Benomyl. Journal of Agricultural and Food Chemistry 17(2):267-270. (Also in unpublished submission received Sep 4, 1980 under 0E2409; submitted by Interregional Research Project No. 4, New Brunswick, N.J.; CDL:099579-C)

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00054214	E.I. du Pont de Nemours & Company, Incorporated (1973) Benomyl: Feeding and Residue Studies with Laying Hens. (Unpublished study received on unknown date under 2F1218; CDL:091046-B)
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00061618	Lee, K.P. (1977) Methyl-1-(butylcarbamoyl)-2-benzimidazole carbamate (INT-1991): H-5167--MR-2529--Biochemicals Department: Two-Year Feeding Study--Beagle Dogs: Supplementary Pathology Report No. 74-77. (Unpublished study received Feb 9, 1978 under 352-354; submitted by E.I. du Pont de Nemours & Co., Wilmington, Del.; CDL:232864-A)
00063822	FMC Corporation (1973?) FMC Polyram--Benlate Apple Residue Samples. (Unpublished study received Feb 6, 1975 under 279-2032; CDL:227773-B)
00064820	Dashiell, O.L.; Ashley, P. (1980) Eye Irritation in Rabbits--EPA Pesticide Registration: Haskell Laboratory Report No. 497-80. (Unpublished study received Aug 8, 1980 under 352-396; submitted by E.I. du Pont de Nemours & Co., Wilmington, Del.; CDL:243043-B)

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00066773	Sherman, H. (1968) Three-generation Reproduction Study in Rats with 1-Butylcarbamoyl-2-benzimidazolecarbamic Acid, Methyl Ester INT-1991: Haskell Laboratory Report No. 264-68. (Unpublished study received May 18, 1970 under 0F0906; submitted by E.I. du Pont de Nemours & Co., Inc., Wilmington, Del.; CDL:091561-C)
00066782	Knott, W.; Johnston, C.D. (1968) Fungicide 1991--Safety Evaluation on Bluegill Sunfish. (Unpublished study received May 18, 1970 under 0F0906; prepared by Woodard Research Corp., submitted by E.I. du Pont de Nemours & Co., Inc., Wilmington, Del.; CDL: 091561-L)
00066783	Busey, W.M. (1968) Final Report: Acute Dietary Administration--Mallard Ducklings and Bobwhite Quail: Project No. 201-215: MR-581. (Unpublished study received May 18, 1970 under 0F0906; prepared by Hazleton Laboratories, Inc., submitted by E.I. du Pont de Nemours & Co., Inc., Wilmington, Del.; CDL:091561-M)
00066784	E.I. du Pont de Nemours & Company, Incorporated (1968) Residue Data: Benomyl--Bananas. (Compilation; unpublished study received May 18, 1970 under 0F0906; CDL:091561-N)
00066785	Sherman, H.; Fretz, S.B.; Henry, N.W., III; et al. (1968) Three-month Feeding Study on Dogs with 1-Butylcarbamoyl-2-benzimidazolecarbamic Acid, Methyl Ester INT-1991: Haskell Laboratory Report No. 269-68. (Unpublished study received May 18, 1970 under 0F0906; submitted by E.I. du Pont de Nemours & Co., Inc., Wilmington, Del.; CDL:091561-P)

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00070426	Heinemann, J.M. (1971) Final Report: Acute Static Fish Toxicity Study--Freshwater: Project No. 201-25.) (Unpublished study received on unknown date under 352-EX-73; prepared by TRW, Inc., submitted by E.I. du Pont de Nemours & Co., Wilmington, Del.; CDL:127068-D)
00077070	E.I. du Pont de Nemours & Company (1977) Benomyl Residue--Various Crops. (Compilation; unpublished study received Jun 25, 1981 under 352-354; CDL:245488-A)
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GS0119-027	U.S. EPA (1979) Benomyl Position Document 2/3. August 22, 1979. Special Pesticide Review Division, Office of Pesticide Programs.
GS0119-028	U.S. EPA (1982) Benomyl/Thiophanate-Methyl Position Document 4. October 1, 1982. Special Pesticide Review Division, Office of Pesticide Programs.
GS0119-029	California Dept. of Food and Agriculture (1976) Requesting A Tolerance for Benomyl on Garlic. (Unpublished study, received December 30, 1976. under ~~PP~~#7E1929. Agricultural Chemicals and Feed Division. Sacramento, CA).
GS0119-030	IR-4 Project. (1976) Section D. Petition Proposing Tolerances for Sweet Corn Production as a Seed Treatment. (Unpublished study, received March 3, 1976. under PP#6F1760. Rutgers Univ. New Brunswick, NJ.)

V. FORMS APPENDICES

EPA Form 8580-1	FIFRA §3(c)(2)(B) Summary Sheet
EPA Form 8580-6	Certification of Attempt to Enter Into an Agreement with Other Registrants for Development of Data
EPA Form 8580-	Product Specific Data Report (End-Use Products)
EPA Form 8580-	Formulator's Exemption Statement

OMB Approval No. 2000-0468

FIFRA SECTION 3(C)(2)(B) SUMMARY SHEET	EPA REGISTRATION NO.
PRODUCT NAME	
APPLICANT'S NAME	DATE GUIDANCE DOCUMENT ISSUED

With respect to the requirement to submit "generic" data imposed by the FIFRA section 3(C)(2)(B) notice contained in the referenced Guidance Document, I am responding in the following manner:

☐ 1. I will submit data in a timely manner to satisfy the following requirements. If the test procedures I will use deviate from (or are not specified in) the Registration Guidelines or the Protocols contained in the Reports of Expert Groups to the Chemicals Group, OECD Chemicals Testing Programme, I enclose the protocols that I will use:

☐ 2. I have entered into an agreement with one or more other registrants under FIFRA section 3(C)(2)(B)(ii) to satisfy the following data requirements. The tests, and any required protocols, will be submitted to EPA by:

NAME OF OTHER REGISTRANT

☐ 3. I enclose completed "Certification of Attempt to Enter Into an Agreement with Other Registrants for Development of Data" with respect to the following data requirements.

☐ 4. I request that you amend my registration by deleting the following uses (this option is not available to applicants for new products):

☐ 5. I request voluntary cancellation of the registration of this product. (This option is not available to applicants for new products.)

REGISTRANT'S AUTHORIZED REPRESENTATIVE	SIGNATURE	DATE

EPA Form [illegible]

OMB Approval No. 2000-0468

CERTIFICATION OF ATTEMPT TO ENTER INTO AN AGREEMENT WITH OTHER REGISTRANTS FOR DEVELOPMENT OF DATA

(To qualify, certify ALL four items)

1. I am duly authorized to represent the following firm(s) who are subject to the requirements of a Notice under FIFRA Section 3(c)(2)(B) contained in a Guidance Document to submit data concerning the active ingredient:

GUIDANCE DOCUMENT DATE

ACTIVE INGREDIENT

NAME OF FIRM	EPA COMPANY NUMBER

(This firm or group of firms is referred to below as "my firm".)

2. My firm is willing to develop and submit the data as required by that Notice, if necessary. However, my firm would prefer to enter into an agreement with one or more other registrants to develop jointly, or to share in the cost of developing, the following required items or data:

3. My firm has offered in writing to enter into such an agreement. Copies of the offers are attached. That offer was irrevocable and included an offer to be bound by an arbitration decision under FIFRA Section 3(c)(2)(B)(iii) if final agreement on all terms could not be reached otherwise. This offer was made to the following firm(s) on the following date(s):

NAME OF FIRM	DATE OF OFFER

However, none of those firm(s) accepted my offer.

4. My firm requests that EPA not suspend the registration(s) of my firm's product(s), if any of the firms named in paragraph (3) above have agreed to submit the data listed in paragraph (2) above in accordance with the Notice. I understand EPA will promptly inform me whether my firm must submit data to avoid suspension of its registration(s) under FIFRA Section 3(c)(2)(B). (This statement does not apply to applicants for new products.) I give EPA permission to disclose this statement upon request.

TYPED NAME	SIGNATURE	DATE

EPA Form [illegible]

PRODUCT SPECIFIC DATA REPORT

EPA Registration No.________________ Guidance Document for________________________

Date________________________

Registration Guideline No.	Name of Test	Test not required for my product listed above (check below)	I am complying with data requirements by		(For EPA Use Only) Accession Numbers Assigned
			Citing MRID#	Submitting Data (Attached)	
§158.20 PRODUCT CHEMISTRY					
61-1	Identity of ingredients				
61-2	Statement of composition				
61-3	Discussion of formation of ingredients				
62-1	Preliminary analysis				
62-2	Certification of limits				
62-3	Analytical methods for enforcement limits				
63-2	Color				
63-3	Physical state				
63-4	Odor				
63-5	Melting point				
63-6	Boiling point				
63-7	Density, bulk-density, or specific gravity				
63-8	Solubility				
63-9	Vapor pressure				
63-10	Dissociation constant				
63-11	Octanol/water partition coefficient				
63-12	pH				

Registration Guideline No.	Name of Test	Test not required for my product listed above (check below)	I am complying with data requirements by		(For EPA Use Only) Accession Numbers Assigned
			Citing MRID#	Submitting Data (Attached)	
63-13	Stability				
63-14	Oxidizing/reducing reaction				
63-15	Flammability				
63-16	Explodability				
63-17	Storage stability				
63-18	Viscosity				
63-19	Miscibility				
63-20	Corrosion characteristics				
63-21	Dielectric breakdown voltage				
§158.135 TOXICOLOGY					
81-1	Acute oral LD-50, rat				
81-2	Acute dermal LD-50				
81-3	Acute inhalation, LC-50 rat				
81-4	Primary eye irritation, rabbit				
81-5	Primary dermal irritation				
81-6	Dermal sensitization				

FORMULATOR'S EXEMPTION STATEMENT
(40 CFR 152.85)

EPA File Symbol/Reg. No. ______________ Product Name ______________________

Applicant's Name and Address ____

____

____

____

As an authorized representative of the applicant for registration of the product identified above, I hereby certify that:

(1) This product contains the active ingredient(s): ____________________

____

____

(2) Each active ingredient listed in paragraph (1) is present solely as the result of the incorporation into the product (during formulation or packaging) of another product which contains that active ingredient, which is registered under FIFRA sec. 3, and which is purchased by us from another producer.

(3) Indicate by circling (A) or (B) below which paragraph applies:

(A) An accurate Confidential Statement of Formula (EPA Form 8570-4) for the above identified product is attached to this statement. That formula statement indicates, by company name, registration number and product name, the source of the active ingredient(s) listed in paragraph (1).

OR

(B) The Confidential Statement of Formula dated __________ on file with the EPA is complete, current and accurate and contains the information required on the current CSF Form No. 8570-4. The registered source(s) of the active ingredient(s) listed in paragraph (1) is/are listed below:

Active ingredient	Source: Product name and Reg. No.

Signature ______________________________

Date ______________ Title ______________________________

EPA Form (April 1985)

FORMULATOR'S EXEMPTION STATEMENT
(40 CFR 152.85)

EPA File Symbol/Reg. No. ______________ Product Name ______________________

Applicant's Name and Address ____

____

____

____

As an authorized representative of the applicant for registration of the product identified above, I hereby certify that:

(1) This product contains the active ingredient(s): ________________

____

____

(2) Each active ingredient listed in paragraph (1) is present solely as the result of the incorporation into the product (during formulation or packaging) of another product which contains that active ingredient, which is registered under FIFRA sec. 3, and which is purchased by us from another producer.

(3) Indicate by circling (A) or (B) below which paragraph applies:

(A) An accurate Confidential Statement of Formula (EPA Form 8570-4) for the above identified product is attached to this statement. That formula statement indicates, by company name, registration number and product name, the source of the active ingredient(s) listed in paragraph (1).

OR

(B) The Confidential Statement of Formula dated __________ on file with the EPA is complete, current and accurate and contains the information required on the current CSF Form No. 8570-4. The registered source(s) of the active ingredient(s) listed in paragraph (1) is/are listed below:

Active ingredient	Source: Product name and Reg. No.

Signature ________________________________

Date ______________ Title ________________________________

EPA Form (April 1985)